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The Emotional Responses following Injury in Recreational Athletes: The Development of the Emotional Response to Rugby Union Injury Scale (Volume 2).

Stuart A. Jones

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Chapter 6

Study 4: Confirmatory Factor Analysis of the ERRUIS, examination of perceived injury severity, social support and test of the buffering hypothesis. Effects on the emotional responses following injury in recreational level rugby union players.

6.1 Introduction

In response to the conceptual and methodological gaps in the existing sports injury response literature as outlined in chapter 2, the overarching aim of this thesis was to investigate the emotional responses of injured recreational level rugby union players with the eventual aim to develop a frequency scale measuring the emotional responses following injury in recreational rugby union players. The rationale for selecting recreational level rugby union players was discussed in section 1.2. Chapter 5 outlined the development and initial validation of the Emotional Responses to Rugby Union Injury Scale (ERRUIS). The chapter details the initial item generation, piloting work and initial construct validity of the scale. Exploratory factor analysis, using an oblique (promax) method of factor rotation and principal axis factoring resulted in the development of a 52-item frequency measure that comprised seven subscales: 'Anger', 'Low/Depressive feelings', 'Positive Emotions', 'Anxiety', 'Fear', 'Apathy/Boredom', and 'Confusion'. Cronbach alpha coefficient for the subscales were .927, .917, .913, .903, .899, .889 and.871 respectively.

As stated in Chapter 5, conceptual justification for these subscales as emotional responses was discussed in section 1.5. In addition, the findings of the qualitative studies of this programme of research provided support that these subscales represent the emotional response characteristics in injured recreational level rugby union players. The EFA, reported in chapter 5, provided initial construct validity of the scale as a clear seven factor structure was identified. In addition, inter-factor correlations suggested significant

correlations between many of the emotional responses outlined in the scale; this was also consistent with the findings of study 1 and 2 of this programme of research.

Despite the findings outlined in Chapter 5 providing some preliminary support for the ERRUIS as a measure of the frequency of emotional feelings experienced by recreational level rugby union players following injury, a number of limitations were reported. A confirmatory factor analysis (CFA), using a different sample was considered necessary to further evaluate the psychometric properties of the scale and provide support in relation to its construct validity prior to utilising the scale in both research and applied contexts (Haig, 2005, Evans et al, 2008).

In addition, the study outlined in chapter 5 did not test the ERRUIS in relation to the Wiese-Bjornstal et al (1998) model of injury response. This model proposed that a number of personal and situational factors can influence the cognitive appraisal of injury and, as a consequence, the emotional response following injury. For example, the factor that has received the most theoretical and empirical attention is social support, with a growing body of research, both in the quantitative and qualitative literature, highlighting the critical role that social support can have on the sports injury response (e.g. Udry, 1997; Johnston and Carroll, 1998; Bianco, 2001; Tracey, 2003; Podlog and Eklund, 2006; Rees et al, 2010; Mitchell et al, 2013). Empirical research has reported that social support can have a major impact on the injury response through reducing distress (Bianco et al, 1999; Tracey, 2003) and fears of re-injury (Podlog and Ekulund, 2004, 2006). In addition, it has also been suggested that through increasing self-confidence and motivation (e.g. Magyar and Duda, 2000; Bianco et al, 2001), social support may also impact on the behavioural responses following injury, specifically increasing rehabilitation adherence (Evans et al, 2000; Duda et al, 1989; Johnston and Carroll, 1998; Fisher et al, 1988). Not only has social support been seen as having a positive impact on an athlete's coping mechanisms following injury, but seeking social support, such as seeking advice from medical staff is seen as actual coping response following injury. Indeed, Corban et al (2003) stated that seeking social support was the most frequently adopted coping mechanism employed by rugby union players. Given these findings from both the quantitative and qualitative

literature, it is perhaps unsurprising that social support is considered a major aspect in cognitive appraisal following injury, which can impact on the emotional and behavioural response (Rees et al, 2010).

However, Arvinen-Barrow and Pack (2013) suggested that despite the literature being consistent with the Wiese-Bjornstal et al (1998) theoretical perspective in highlighting the important role of social support in injury response, there has been less research exploring the underlying mechanisms of social support in relation to the injury response. Indeed, Rees et al (2010) claimed that there is no definitive understanding of how social support per se operates in relation to enhancing the emotional and behavioural response following injury. Despite this, two principal models have been proposed to explain the mechanisms in which social support influences health, these being the main effect model and the buffering effect, see section 2.4.

Rees et al (2010) proposed that in relation to sport injury, the negative impact between stressors and the injury response would be buffered for injured athletes with high level of social support in comparison to those with lower levels of social support. In addition, if the injured athlete is experiencing lower levels of stress, the level of social support would be less important in relation to the injury response. As a consequence, Rees et al (2010) stated that empirical research is needed to explore the applicability of the buffering effect of social support to a sports injury setting as this potentially has important practical implications for rehabilitation professionals, sports coaches and the injured athlete themselves.

According to Rees et al (2010) in relation to sports injury, the main effect model postulates that, irrespective of the level of stress experienced, social support would have a beneficial effect on the responses following injury. Specifically, the perceptions of social support will lead to more positive responses which will not necessarily involve a re-appraisal of the stress. Wheaton (1985) reported, in support of the main effect model, that stressors and social support could be associated with separate effects, with the perception of supportive relationships offsetting the detrimental relationships between the experience

of stress and the injury response. This differs from the stress-buffering model which suggests that the impact of social support can result in a re-appraisal of the stress once the stress has been experienced.

Rees et al (2010) conducted moderated hierarchical regression analysis to explore the main and buffering effect of social support and the psychological response in injured athletes. This methodology has been considered the standard procedure in exploring buffering effects (Cohen and Willis, 1985; Biddle, Markland, Gilbourne, Chatzisarantis and Sparkes, 2001). Interestingly, their research suggested the sporting performance standards of the injured athletes also had a role in the relationship between social support, stressors and the psychological response following injury. Specifically, Rees et al (2010) reported that for elite level injured athletes a main effect relationship concerning social support and psychological response was found. Furthermore, for this group no stress buffering relationship was reported. For the lower level injured athletes, similar to the sample that has been discussed throughout this thesis; a significant stress-buffering relationship was reported. Therefore, Rees et al (2010) concluded that for lower level injured athletes, the detrimental effect of high level of stressors on the psychological responses were lower for injured athletes with high support provision in comparison to those with lower levels of social support. However, when low levels of stress were experienced, the levels of social support had little impact on the psychological responses following injury in these participants.

Whilst Rees et al (2010) hypothesised both a main effect and a buffering effect of social support on the psychological responses following injury irrespective of the sports participation level, they did state that the additional investment that elite athletes devote to their sports participation, particularly in relation to athletic identity, could mean that social support is more likely to have an impact on the psychological responses following injury even in situations where low stress is perceived. However, Rees et al (2010) did also report that this conclusion was not necessarily based on empirical evidence as research exploring the responses following injury in recreational level athletes is extremely limited. Indeed, thefindings of study 1 of this programme of research (Chapter 3), suggested that

recreational level athletes do also make investment to their sport and obtaining a sports injury can be a time of great distress for such athletes. Whilst it is inappropriate to compare the loss of athletic identity following sports injury between elite and recreational level athletes, it was also apparent that recreational level athletes can also experience athletic identity losses following injury. Additionally, Rees et al (2010) discussed how loss of income following sports injury in elite level athletes further highlights the increased personal investment and could further explain the main effect relationship between social support and the psychological responses following injury. However, as reported in chapter 3, sports injury can also lead to loss / disruption in work in recreational level athletes. Indeed, in terms of loss, it is plausible to suggest that severely injured recreational athletes will not only experience disruptions in the relationships with athletic teammates but also may experience disruptions involving relationships with work colleagues.

However, follow up studies exploring the relationship between stress, social support and the psychological response following injury have yielded inconsistent findings. For example, Rees et al (2010) conducted a follow up regression analysis to assess the study relationships for both elite and non-elite athlete level participants simultaneously. In this instance, a three-way interaction between athletic level, stressors and social support on the outcome variable of the psychological response following injury was carried out to assess the impact of performance standard. Using the same data set as for the first aspect of the study, their findings this time revealed no significant three-way interaction between the performance level variable and psychological responses across all models assessed. Indeed, in this follow up whilst they reported significant main effects of social support and stress levels on the psychological responses following injury, there was no significant relationship between the product of social support and stress on the psychological response. Therefore, it could be concluded that the impact of performance standard on the relationship between stress, social support and the psychological responses following injury was not as robust as they claimed following the initial moderated hierarchical regression. Indeed, whilst the follow up further demonstrated the impact of social support on the psychological response following injury in relation to a main effect relationship, it did not support the stress-buffering hypothesis.

However, in relation to life satisfaction scores, Malinauskas (2010) study found that social support did buffer the relationship between stress and negative life satisfaction in injured college athletes. Indeed, they reported a stronger impact of the buffering effect of social support on the stress/life satisfaction relationship in athletes who had more serious injuries. This relationship was in the direction hypothesised by the author, specifically that in situations of high stress, social support can reduce (buffer) the detrimental relationship between stressors on life satisfaction. In other words, injured athletes with high stress would have a reduced negative life satisfaction score if they had high levels of social support compared to high stress injured athletes with little social support. However, there were a number of limitations of this study. First, the sample size was rather small for quantitative research (n = 123), particularly as this number was later divided into different injury severity groups (severe injury = 69, minor injury 54). Secondly, the study did not take into account the injured athletes' participation level despite Rees et al (2010) suggesting that this may have an impact on the relationship between social support, stress and the injury response. Furthermore, whilst this study does provide support for the stress-buffering model, it did not explore the relationship between social support, stress, and the emotional response following injury which may be considered more prevalent to rehabilitation professionals given the hypothesised relationship between the emotional and behavioural responses. In addition, the measure of social support, although considered multidimensional was not developed using sports injury, therefore the content validity of the measure for this study could be questioned. In relation to this, the coefficient alpha for the social support measure used in this study was .61, which is below the acceptable levels proposed by Nunnally (1978).

Mitchell et al (2013) further explored the relationship between stress, social support and the psychological responses following injury through examining the effects of perceived (study 1) and received (study 2) social support on stress and the psychological response using moderated hierarchical regression. In addition, the impact of the different types of social support, namely information, esteem, emotional and tangible support, was also taken into account. Their findings provided support for both the main effect and the stress-buffering hypothesis in relation to perceived support. Specifically, stress-buffering effects

were reported in relation to the perceived esteem support and feelings of 'isolation', 'restlessness' and 'feeling cheated'. There was also a significant buffering effect in relation to perceived emotional support and feelings of 'isolation'. This buffering effect was reported in the direction hypothesised, in that the detrimental relationship between stressors and negative psychological responses was reduced by a high perceived availability of social support. The findings of study 2 did not support the buffering hypothesis, although as with study one a significant main effect was reported for both stress and emotional, tangible and esteem support in relation to the feelings of 'isolation', 'restlessness' and 'feeling cheated'. It is important to note that Mitchell et al (2013) used a sample of injured athletes from a variety of sports participation levels and did not conduct separate analysis based on sports participation levels.

Therefore, given the inconsistencies in the existing research results, it could be concluded that empirical support for the stress-buffering hypothesis in relation to the sports injury response has been largely inconclusive and more research is needed to provide a further understanding of the impact of social support on the injury response. In addition, it is important to highlight that existing quantitative research has not examined the relationship between social support and the emotional response following injury, but rather social support and the psychological response. As noted previously, this is different conceptually to the proposed integrated injury response model outlined by Wiese-Bjornstal et al (1998). Indeed, Weise-Bjornstal et al (1998) stated that social support has a great impact on the emotional response following injury and existing qualitative studies has discussed the impact of social support on the emotional responses following injury and not the psychological response (e.g. Tracey, 2003; Bianco, 2001; Bianco et al, 1999; Podlog and Eklund, 2007b and c). Therefore, it is plausible to suggest that one reason for the inconsistencies in the findings has been the measures used to explore the injury response.

Wiese Bjornstal et al (1998) also postulated that injury severity could have an impact on the athlete's appraisal of the situation and subsequently the emotional and behavioural response. In the last twenty years, a number of studies have examined the relationship between the injury severity and the injury response. For example, Brewer et al (1995a)

examined emotional adjustment in 121 injured athletes and concluded that the injury status as reported by the physician was strongly correlated with post-injury depression which was measured using the Beck Depression Inventory. However, it is important to note that injury status rating, whilst possibly linked, is not the same as perceptions of injury severity and Brewer et al (1995a) did not report a correlation between rehabilitation professionals' perceptions of the injury severity and the emotional adjustment experienced by the athlete. This was a contrast to earlier research which reported that injury severity, as measured by the total time absence from participation, is correlated with increases in tension, anger, and depression (Smith et al, 1990b). In addition, Smith et al (1990b) reported that injury severity was correlated with higher frequency of emotional disturbances throughout the injury period. Smith et al's (1993) prospective study exploring pre and post injury differences in mood states concluded that the only significant predictor of changes in mood states, particularly in relation to depression, was injury severity which was measured by the total absence from sporting participation due to injury. Consequently, Smith et al (1993) concluded that post-injury mood disturbances are not a reflection of pre-injury mood levels but related to the severity of injury.

In a study that made a direct comparison of the mood responses of athletes suffering from what can be classified as a serious injury (anterior cruciate ligament injury) and those suffering from a less serious injury (concussion), Mainwairing et al (2010) reported significantly higher levels of depression, in relation to intensity and frequency, for the anterior cruciate ligament group than for those who had suffered concussion. However, there was no significant difference in relation to total mood disturbance as measured by the POMS (McNair et al, 1971). Nevertheless, in comparison to a non-injured control group, both the anterior cruciate ligament group and the concussion group reported significant changes in both depression and total mood disturbance. Whilst the authors concluded that the nature of sport injury can impact on the emotional response, the sample size for this quantitative study was relatively low (total n = 61). In addition the authors did not account for other related factors thought to influence the injury response, such as perceived injury severity, history of injuries, perception of pain, injury timing, issues in rehabilitation amongst others.

Therefore, whilst injury severity is widely thought to influence the emotional response following injury, empirical studies that have evaluated the relationship have yielded some discrepancies and been largely inconclusive. One explanation for this is the inconsistencies in measuring injury severity. For example Brewer et al (1995b; 2003a), who did not report a correlation between injury severity and mood disturbance, used reports by the rehabilitation professional as a measure of injury severity. In contrast Smith et al (1990a,b, 1993), who did report a positive correlation between injury severity and mood disturbance, measured injury severity through absence of sports participation as a consequence of injury. However, very little research has been carried out that has taken into account the injured athletes' perception of the injury severity (Taylor and May, 1996). The Wiese-Bjornstal et al (1998) model proposed that injury severity is a personal factor thought to influence the athlete's individual appraisal of the situation. Therefore, it could be postulated that the athlete's interpretation of the injury severity is a more salient factor in the cognitive appraisal than the actual severity. Indeed, in a non athletic sample, Geiger et al (2011) stated that there were significant differences between participants' own perceptions of injury severity and reports using an objective measure of injury severity. In addition, Brasel et al (2010) reported in a non-sporting sample that perceived injury severity is a more important predictor of health related quality of life, including emotional well-being, than more objective measures of injury severity. In relation to sports injury response, it has been recommended that more research should consider the athlete's perception of sports injury severity (Evans et al, 2006).

As stated, obtaining a sports injury can be seen as a period of significant stress for the individual. The sources of stress as a result of sports injury are widespread including a number of personal and situational factors, some of which are outlined by Wiese-Bjornstal et al (1998) as part of the appraisal framework. Empirical studies, such as Johnson and Carroll (1998) and Bianco (2001), have outlined several sources of stress following injury including: perceived injury severity, fear of re-injury, inability to train, pain, loss of camaraderie and isolation, pressure from coaches and family and weight gain.

In relation to perceived injury severity, Malinauskas (2010) study which has been discussed above, reported a significant main effect between the severity of injury, as measured by the time absent from sports participation and perceived stress. Specifically, participants with higher levels of injury severity reporting higher levels of perceived stress. In addition, injury severity was also correlated with diminished levels of life satisfaction. This led Malinauskas (2010) to conclude that injury severity is a major source of stress for injured athletes and that injury severity is a strong indicator of stress levels experienced by the injured athletes. In addition to the limitations to this study as addressed previously regarding the measure of social support used, Malinauskas (2010) used the time missing from sports participation as the measure of injury severity. As stated, it has been recommended that researchers should take into account individual perceptions of injury severity. In addition, it has also been suggested that the relationship between social support and injury severity is more complex than has been suggested in the stress-buffering model. For example Taylor and Taylor (1997) suggested that both actual and perceived injury severity can influence the injured athlete's perception on the social support that is required, provided and received, this therefore can impact on such findings.

Nevertheless, Malinauskas (2010) study suggested that injury severity is a significant source of stress for the athlete which was also supported by the findings of study 1 of this programme of research. The athletes who perceived their injuries to be severe, or potentially severe, appeared to display higher levels of anxiety and stress levels compared to those less concerned about the severity of the injury. However, it is important not to assume that individuals with low severity injuries will not have a high intensity or frequency of emotional disturbance. It is important to consider the perceived injury severity as part of an appraisal framework in which the consequences of the injury in relation to its outcome are major factors in the emotional response (Evans et al, 2006). Consequently, researchers are encouraged to adopt measures that assess the individuals' perception of injury severity as opposed to more objective measures of severity, such as absence from sports participation or rehabilitation professional ratings.

Therefore, the aim of this chapter was to report the findings of a study that can be considered two-fold with its results reported in two stages, both of which were essential to the overarching aims of this programme of research outlined in section 1.6. The first stage of this study was to provide confirmation of the construct validity of the ERRUIS as a frequency scale measure of the emotional responses following injury in recreational rugby union players. The second stage examined the effect of the number of factors thought to influence the emotional response following injury. Specifically, the effect of perceived injury severity on the emotional responses following injury in recreational rugby union players. Furthermore, this study explored the main and buffering effects of social support and the emotional response following injury in recreational rugby union players. As stated above, qualitative and quantitative research has suggested that perceived injury severity can be considered a source of significant stress with athletes perceiving their injury as severe more likely to report higher stress and its associated feelings. Therefore, this study explored the stress buffering effects of social support with perceived injured severity being the indicator of stress. This study not only addresses the second aspect of the overarching aims of this thesis and provides further validation of the ERRUIS, but as it was the first quantitative study to examine the relationship between social support, perceived injury severity and the emotional responses following sporting injury using a recreational level sample, enhanced the knowledge base in relation factors thought to influence the emotional response which was part of the first aspect of the overarching aim outlined in section 1.6.

6.2 Research hypotheses – Stage 2.

As a consequence of the interpretations of study 1 and 2 of this programme of research in addition to the theoretical underpinning of the stress-buffering effects of social support, three hypotheses were made in relation to the second stage of this study.

Hypothesis 1: There will be a significant main effect for injury severity: Specifically, injury severity will be associated with an increased frequency of negative emotional responses to sport injury and a lower frequency of positive emotional responses.

Hypothesis 2: There will be a main effect for social support: Social support will be associated with a lower frequency of negative emotional responses following sports injury and a higher frequency of positive emotional responses.

Hypothesis 3: There will be an interaction of social support and injury severity, supporting the stress-buffering hypothesis. Specifically, the relationships between injury severity and negative emotional responses would be reduced (buffered) for those with high social support in comparison to those with low social support, but level of social support would be relatively unimportant at low levels of perceived injury severity. Similarly, the relationship between injury severity and the frequency of positive emotional responses would be increased for those with high social support in comparison to those with lower levels of social support, but level of social support would be relatively unimportant to the frequency of positive emotional responses at low levels of perceived injury severity.

6.3 Confirmatory Factor Analysis.

Most often used in the social sciences and social research, confirmatory factor analysis (CFA) is a commonly employed method to test whether measures of a construct are consistent with that hypothesised, a priori, by the researcher (Kline, 2010). Originally developed by Jöreskog (1969), this approach may have similar mathematical procedures to an EFA but they are considered conceptually different forms of analysis (Brown, 2006).

The key difference conceptually between an EFA and a CFA is that while the interpretations and data reduction following an EFA is data-driven and considered an exploratory or descriptive procedure, all aspects of the factor model must be pre-specified by the researcher prior to running a confirmatory factor analysis (Brown, 2006). These include the number of factors and also the pattern of factor loadings. Therefore, as a consequence, it is recommended that a strong conceptual and/or empirical framework is established prior to conducting the CFA in order to guide the specification of the model. Indeed, Rattray and Jones (2007) stated that evidence of good practice in scale development is to run a CFA during the latter stages of scale development, after detailed

theoretical and empirical underpinnings through the use of an EFA has led development of a model in which the factor structure can be predicted. Given the similarities in the mathematical procedures, it is recommended that a CFA follow up to an EFA procedure is conducted on a different sample (Harrington, 2009) as CFA analysis using the same data set that was used in the EFA will invariably lead to near identical conclusions (Hurley et al, 1997).

Another key difference between an EFA and a CFA relates to how factor cross-loadings are handled in multiple factor models. Table 5.1 highlighted that factor loadings for the 7 factor solution of the ERRUIS following the EFA study. This demonstrated that all items loaded on all factors and a rotation method was used, in this case the oblique promax rotation method, to clarify the factor structure and maximize the weight of the primary loadings. However, in a CFA factor rotation methods do not apply as the structure is obtained through specifying items to load on a single factor (Brown, 2006). As a consequence, CFA models are considered more parsimonious, containing a smaller number of parameters, than an EFA counterpart as no inter-factor relationships are specified as part of the hypothesised model in simple structures. In exploratory factor analysis, relationships between all of the items and all of the factors are explored and, as a consequence, the issue and interpretation of cross-loading and the decisions that are made if cross-loading is evident are open to the researchers' interpretation during an EFA and this can lead modifications to a scale that is not based on the theory (Brown, 2006).

As an example, in chapter 5 it was reported that four items of the original 56 item ERRUIS were cross-loading and therefore omitted from the final factor structure as reported in table 5.1. It was thought that these four items were not adding to the 52 item scale and the evidence of cross-loading led to the conclusion that participant interpretation of these statements was not consistent. Consequently, these items were subsequently omitted from future analysis as the content validity of these four items was questioned. However, these four items were considered essential during the item generation stage with the physiotherapists (outlined in section 5.3) and were considered to have high content validity. Nevertheless, omitting items based on factor loading weights and cross-loading

following an EFA in addition to subsequent re-assessment of the statements in relation to its importance to the scale is considered standard practice in exploratory scale development (Rattray and Jones, 2007). As a consequence, there was some clear justification that these items would have led to issues in producing a hypothesised model in a CFA. Specifically, it would have been difficult to predict with which factor these items should be placed. Whilst the omission of these items from future confirmatory analysis was considered necessary, this highlights the issues in solely adopting a data-driven approach in scale development and validation.

In addition to the issues involving interpretation and decision making surrounding cross-loading items in EFA, the increased level of parsimony that is often associated with confirmatory factor analysis is considered a strength of using this technique. Each parameter estimate that is associated with a model is likely to increase the level of uncertainty in relation to the validity of the model (Kline, 1994). Therefore, unlike in an EFA the factor solution does not load on all of the factors. Consequently, a CFA typically reports the relationships, or factor loadings, with fewer parameter estimates than EFA. Therefore, as an example, a researcher can be more confident of the construct validity of a good fitting, hypothesised, seven factor scale following CFA in comparison to just using the interpretations of an EFA alone. Having said this, in an ill-fitting model the lack of cross-loading values can lead to uncertainty as to why the hypothesised model might not have fitted well in a new sample. Therefore, it is considered quite common to perform a follow up EFA on the same data set to explore more clearly potential issues relating to cross loading and its impact on the hypothesised model fit (Hurley et al, 1997).

Brown (2006) also reported that CFA is a flexible and strong method for evaluating the equivalence of measurement models amongst distinctive groups, such as comparison of the applicability of a scale amongst different demographic populations. This is particularly useful in the development of scale measuring the responses following sports injury, as Wiese-Bjornstal et al (1998) postulated that a number of personal and situational factors, including demographics, can influence the emotional responses following injury.

Nevertheless, whilst proponents of confirmatory factor analysis might highlight its apparent greater parsimony and flexibility over an EFA, the two techniques should not be considered in relation to their apparent strengths and weaknesses (Kline, 1994). Indeed, Hurley et al (1997) suggested that the two techniques should be used to complement each other at different stages of the scale development. Brannick (1995) reported that, due to the apparent additional robustness of the CFA, the use of CFA in research is increasing and the use of EFA in published work is declining. Indeed, a literature search of the major databases of psychology research (psycINFO, psycARTICLES, Swetwise, Proquest, Medline, SPORTdiscus) would support Brannick's conclusions, as it was apparent that more published scale development studies report the findings of the CFA with little reference to the EFA. However, it is important to be mindful that the primary purpose of a CFA is to confirm the hypothesised model structure that has been guided following extensive theoretical and empirical background research. Hurley et al (1997) stated that EFA is an important stage in the development of a psychometric measure, yet they were alarmed at the trend of researchers making major structural changes to a measure following CFA without conducting a previous EFA. Not only would a prior EFA provide clarity in relation to potential issues in the hypothesised scale, such as cross or low factor loadings, but finalised scales that have been significantly modified due to its poor fitting are in essence becoming a data driven approach, which is not the concept of a CFA. Indeed, Hurley et al (1997) concluded that such drastic modifications are more indicative of an EFA and this would be the more beneficial method to adopt in such circumstances. Therefore, it has been concluded that both EFA and CFA are distinct, but important tools in scale development that should not be compared against one another in terms of their relative strengths and weaknesses but both used appropriately to further the validation of a scale (Kline, 1994; Rattray and Jones, 2007; Hurley et al, 1997).

6.3.1 Considerations for conducting a CFA – Estimation Method.

The aim of the CFA is to obtain estimates for each parameter of the hypothesised model structure (Schreiber et al, 2006). As with an EFA, there are many methods that can be used to estimate the hypothesised factor structure. However, the most readily adopted method is

the maximum likelihood (ML) method (Byrne, 2010). This method "aims to find the parameter values that make the observed data most likely or conversely maximize the likelihood of the parameters given the data" (Brown, 2006, p73). In other words, this method selects the appropriate parameters that make the data most likely to have happened. Consequently, this method appears to compliment the main goal of Confirmatory Factor Analysis. Additionally, as it provides standard errors (SEs) for each parameter estimate, p-values can be calculated for the parameter estimates (Harrington, 2009).

However, consideration should be given in relation to the assumptions needed to satisfactorily adopt this procedure. Firstly, the estimate procedure requires a large sample size. Harrington (2009) recommended a sample size of greater than 200 is necessary to effectively conduct a maximum likelihood procedure. The second assumption is that the items in the data set need to have continuous level of data. In other words, the indicators cannot be ordinal or categorical. The third assumption is that the data should be considered normally-distributed, with little multivariate skewness and kurtosis. This assumption is frequently violated in scale development research particularly if the research involves a specific sample that might not be representative of the population (Kline, 1994). However, Byrne (2010) stated that ML estimation is robust for moderate violations in relation to the normality of the sample. Therefore, even if the assumption of multivariate normal distribution is violated, it has been recommended to adopt a ML estimation method although some caution must be applied in the interpretation and reporting of goodness of fit statistics (Hu and Bentler, 1995; Byrne, 2010). Indeed, Evans et al (2008) employed ML as the estimation method despite reporting high levels of multivariate skewness and kurtosis.

6.3.2 Assessment of Model Fit.

Another aspect that must be considered when conducting a CFA is the interpretation of the model fit, in other words to assess how well the hypothesised structure fits with the data.

Structural Equation Modelling computer programmes, such as EQS, Amos and Lisrel, provide a host of fit indices that can guide the researcher in evaluating the degree to which the sample variance-covariance data fits the hypothesised model. Brown (2006) reported that there are three broad categories of fit indices, these are absolute fit indices, parsimony fit indices and comparative fit indices. Schreiber et al (2006) recommended that researchers report the findings of at least one measurement of model fit that falls into each category

6.3.3 Absolute fit indices.

Absolute fit indices measure the model fit of the hypothesised structure at an absolute level. The most widely applied fit indices that falls into this category is the model $\chi 2$. (Schumacker and Lomax, 2004). A significant $\chi 2$ statistic relative to the degrees of freedom would denote that the observed and the hypothesised variance-covariance matrices differ. Statistical significance would signify the probability that this difference is due to sampling variation. Consequently, a non-significant $\chi 2$ value indicates the observed and predicted matrices are similar, suggesting a good absolute fit for the model (Chan, Lam, Chun and So, 2006).

However, there are a number of limitations in the interpretations of the χ^2 value and consequently, it is rarely used as the sole measure of absolute fit (Brown, 2006). Specifically, the $\chi 2$ value is inflated by sample size and will often produce statistical significance in larger samples. Additionally, Byrne (2010) reported that $\chi 2$ value is particularly inflated in non-normally distributed data compared to other measures of model fit. Therefore in instances in which data is not-normally distributed additional caution is warranted in evaluating the model $\chi 2$ value. Wheaton, Muthen, Alwin and Summers (1977) proposed that the $\chi 2$ /df ratio provides a more realistic model evaluation of absolute fit in comparison to the $\chi 2$ statistic alone and proposed that a $\chi 2$ /df ratio of <2 being more indicative of good model fit. However, subsequent follow up studies (such as Wheaton, 1987) have suggested that this approach is equally susceptible to sample size and non-normality and caution should be made with its interpretation. Nevertheless, both the $\chi 2$

value and $\chi 2$ /df ratio are routinely included in scale development research using CFA (e.g. Lane, Sewell, Terry, Batram and Nesti, 1999; McAuley and Courneya, 1994; Evans et al, 2008) and therefore, both were considered and reported when evaluating the model fit of the ERRUIS. However, the researcher was mindful of the limitations of both the $\chi 2$ value and $\chi 2$ /df ratio and consequently interpretation of the model fit based on these two indices alone was viewed with caution.

An alternative assessment of absolute fit that is commonly applied in scale development is the standardised root mean square residual (SRMR). The SRMR is based on the discrepancies between the correlations in the input matrix with those in the hypothesised model. The SRMR is calculated through summing the squared elements of the residual correlation matrix and then dividing this figure by the number of elements in this matrix. The next step would be to take the square root of this figure (Brown, 2006). As such, the SRMR can range between 0 and 1 with the smaller the SRMR, the more acceptable the model fit. Schreiber et al (2006) suggested that an SRMR of ≤ 0.08 would indicate an acceptable model fit. However, Evans et al (2008) stated that SRMR of < 0.05 would indicate a good model fit. As it has been suggested that this is a more robust assessment of absolute model fit in comparison to the $\chi 2$ value and $\chi 2$ /df ratio, the SRMR was also considered and reported when evaluating the model fit of the ERRUIS.

6.3.4 Parsimony Correction Indices.

Parsimony correction indices differ from absolute fit indices as they incorporate a penalty for poor parsimony. As a consequence, over identified models (e.g. models that have more estimated parameters than necessary) will be viewed as having poorer fit irrespective of the level of absolute fit of the hypothesised model (Kline, 2010). The most widely adopted parsimony correction index is the Root Mean Square Error of Approximation (RMSEA, Steiger and Lind, 1980). This calculates the extent to which the model fits in relation to the population. The RMSEA indicates the fit of the model, with unknown but pre-specified parameter estimates, in relation to the population covariance matrix (Hooper,

Coughlan and Mullen, 2008). The RMSEA is widely reported and considered a robust parsimony correction index (Worthington and Whittaker, 2006). Therefore, the RMSEA was reported and evaluated as a measure of model fit for the ERRUIS. As with the SRMR, low RMSEA values are more suggestive of a good fit with values of 0 indicating perfect fit. MacCallum, Browne, and Sugawara (1996) stated that in relation to RMSEA that ≤ 0.01, ≤0.05, ≤0.08 indicate excellent, good and mediocre fit respectively. However, some authors have suggested that these estimates are too rigorous. For example, Schreiber et al (2006) suggested that figures 'close to' 0.06 and less should be considered a good fit, this interpretation has been adopted extensively in scale development research (Worthington and Whittaker, 2006). Brown (2006) recommended that RMSEA of <0.10 can be considered mediocre, but acceptable providing the other measurements of fit indices used were also within the acceptable range.

Browne and Cudek (1993) developed a statistical test which assesses the closeness of fit using RMSEA, this test, known as 'CFit' or 'PClose', is also adopted frequently in scale development research (e.g. Evans et al, 2008; Mitchell et al, 2013). In this, a non-significant p value (e.g. p >0.05) would be in accordance with an acceptable model fit (Browne and Cudek's (1993). Whilst this value is generally accepted in scale development research, Jöreskog and Sörbom (1993) suggested that a 'CFit' p value of >0.5 would be more applicable to in relation to acceptable model fit.

6.3.5 Comparative Fit Indices.

Comparative fit indices are adopted to evaluate the fit of a model in relation to a more restricted nested baseline model (Harrington, 2009). Hooper et al (2008) stated that one of the most reported of all model fit indices in relation to scale development is the Comparative Fit Index (CFI; Bentler, 1990). As its name would suggest the CFI is categorised in this category of fit indices as it compares the fit of the hypothesised model to the fit on a baseline, 'null', model. Hurley et al (1997) conisedered the CFI a very useful value in evaluating the model fit in scale development and, as a consequence, the

CFI was examined and reported in the evaluation of the fit of the ERRUIS. The CFI has a range of values from 0 to 1 with values closer to 1 representing good fit (Kline, 2010). In line with the recommendations of Bentler (1990) and Hu and Bentler (1999), for the puroposes of this study a CFI value of >.95 will be considered a good fit, whereas a CFI of between .90 and .95 will be considered in relation to how well the model has fitted with the other fit indices adopted.

Another popular index that falls under these groups of indices is the Tucker-Lewis Index (TLI; Tucker and Lewis, 1973). The main difference between the TLI and CFI is that TLI also has a parsimony correction element in that there is a penalty function for adding estimate parameters that do not add to the value or fit of the model (Brown, 2006). It is generally agreed that TLI values of 'close to' or >.95 indicates a good fitting model (Schreiber et al, 2006). Therefore, as with CFI, it is considered that the higher the value the more indicative of good model fit (Brown, 2006). Given that this index is also considered robust against sample size and distribution and also takes into account the hypothesised parameter estimates, this method is also often included in scale validation confirmatory studies (Harrington, 2009). Byrne (2010) claimed that in measures of model fit in a CFA, researchers should use the $\chi 2$ statistic, the SRMR, the RMSEA, the CFI and the TLI as part of the evaluation and interpretation of the model fit. The indices discussed above are considered most robust and provide the researcher with a detailed interpretation of the model fit (Brown, 2006; Harrington, 2009; Schumacker and Lomax, 2004; Schreiber et al, 2006).

6.3.6 Sampling Considerations.

As with an EFA, sampling size is a critical consideration for conducting a CFA. It is agreed that for CFA the larger the sample size the better (Harrington, 2009). However, there is no agreement about the specific sample size requirements for a CFA and rules of thumb proposals, whilst still prevalent, can be widespread and result in a varying sample sizes. For example, Lee and Song (2004) suggested that a ratio of sample size of 4 participants per 1 known parameter is appropriate in most cases, whereas Schreiber et al

(2006) supported the ratio of 10 participants per 1 known parameter. Arrindel and Van Der Ende (1985) suggested that for both exploratory and confirmatory analysis a sample ratio of 20 participants per factor is sufficient. Naturally, given the widespread and potential varying sample sizes between the three rules of thumb approaches outlined, considering a sample size based on one of these rules of thumb method alone is not recommended.

Kline (2010) proposed that for CFA, consideration should be given to the overall sample size as opposed to using a participant to item ratio rule of thumb approach. He suggested that sample sizes of less than 100 is considered small when running a CFA, 100-200 is considered medium sized according to Kline (2010) whereas a sample greater than 200 participants should be deemed large and acceptable for running a complex CFA. Muthen and Muthen (2002) Monte Carlo approach to sampling adequacy, made suggestions that a sample of 150 was adequate in confirmatory analysis with normal distribution and no missing data, a sample of 265 was adequate in a CFA with non-normal but no missing data, and a sample of 315 participants or above was adequate in analysis with non-normal and missing data. Therefore, Field (2013) concluded that a sample size of over 300 is often adequate irrespective of the complexities of the model.

In addition, the population of the sample is an important aspect to consider in conducting a CFA. As part of the aim of this study was to test the model fit of a hypothesised model, which was developed with injured recreational rugby union players, it was critical that the sample regarding the CFA also met the criteria of being injured recreational level rugby union players. As with study 3, reported in chapter 5, participants were considered eligible provided they play rugby union, but not at professional or semi-professional level and were considered currently injured based on the classification put forward by the NAIRS (cited by Fuller, 2005). Therefore, eligible participants needed to fit one of the four classifications discussed in section 1.3.

6.4 Method.

6.4.1 Participants.

A total of 418 questionnaire packs were distributed to participants, who had not been involved in any of the previous studies reported in this thesis and who were thought to meet the sampling requirements. Of these, 16 were either completed by participants who did not meet the sampling criteria or had a least one response omitted. Therefore, data from 402 participants were used in the analysis of both studies (mean age = 27.31 years, SD = 5.97, range 18-45; male = 344, female = 58).

There were a total of 75 different types of current injuries coded based on the participants' definition (see Appendix 46). The mean number of rugby union matches or training sessions lost due to the current injury was 6.55 (SD = 4.17, range 2-30). However, as with the EFA study, some of the responses only offered an approximation in relation of games/training sessions lost. Additionally, as with the EFA study, all participants reported that they were expecting to miss further training and matches as a result of the injury; therefore the number of matches missed as reported by the participants was not the final total.

6.4.2 Research Setting.

Similar to the EFA study, the locations in which the questionnaires were distributed was also considered as a specific sample of injured recreational level rugby union players was required. The researcher obtained consent to distribute questionnaire packs at 18 private physiotherapy, alternative therapy and sports therapy centres in the West Wales region. Also, consent was given to distribute questionnaires at rehabilitation (physiotherapy) clinics at four NHS centres in the region. Additionally, consent was granted to distribute questionnaires at 20 non-professional rugby union clubs in West Wales. Questionnaire packs were also distributed at six leisure centres in the West Wales region that offer GP referral service.

6.4.3 Materials.

Modified Emotional Responses to Rugby Union Injury Scale (ERRUIS, see Appendix 44): The purpose of this thesis was to develop a scale of the emotional response following injury in a population specific study. Following extensive qualitative background research, exploratory factor analysis resulted in the development of a 52 item frequency scale of the emotional responses. This comprised of 7 subscales: 'Anger', 'Low/Depressive Feelings', 'Positive Emotions', 'Anxiety', 'Fear', 'Boredom/Apathy' and 'Confusion'. Cronbach alphas for the subscales were .927, .917, .913, .903, .899, .889 and .871 respectively. Participants were required to report the frequency with which they have experienced the emotional feelings outlined in the 52 statements. Consistent with the cognitive failures questionnaire (CFQ; Broadbent, Cooper, Fritgerald and Parkes, 1982) participants are to respond on a 5 point frequency scale with 1 = Never, 2 = Very Rarely , 3 = Occasionally, 4 = Quite Often and 5 = Very Often.

Demographic Questionnaire (see Appendix 41): As with the EFA study, a 20 item demographic questionnaire based on an existing measure by Smith et al (1990b) was also utilised in this study. These questions pertained to the gender, age, sports participation level, sporting preference, injury diagnosis, length of time absent from sports participation and anticipated recovery. The questions were essential in order to assess if the participants met the sampling criteria highlighted in section 6.3.7.

The second stage of this study was to further assess the convergent validity of the ERRUIS through exploring the relationship between perceived injury severity, social support and the emotional responses following injury in recreational level rugby union players. This second stage aimed to extend the knowledge base in relation to how social support can impact on the emotional response following injury. Based on the stress-buffering model, which conceptualises that social support can buffer the detrimental responses associated when individuals' experience high levels of stress; three main hypotheses were derived. 1). There would be a main effect for perceived injury severity with injured athletes reporting high levels of perceived injury severity more likely to

report a greater frequency of negative emotional responses and a lower frequency of positive emotional responses. 2). There would be a main effect for social support, higher levels of social support would be associated with a lower frequency of detrimental emotional responses and a higher frequency of positive emotional responses. 3). The interaction between social support and perceived injury severity would support the stress-buffering hypothesis. Specifically, the relationship between perceived injury severity and negative emotional responses would be reduced (buffered) for those with high social support in comparison to those with low social support for those with high levels of perceived injury severity, but level of social support would be relatively unimportant at low levels of perceived injury severity. Similarly, the relationship between injury severity and the frequency of positive emotional responses would be increased for those with high social support in comparison to those with lower levels of social support for those with high levels of perceived injury severity, but level of social support would be relatively unimportant to the frequency of positive emotional responses at low levels of perceived injury severity. In order to assess the hypotheses the following measures of perceived injury severity and social support were adopted.

Perceived injury severity: The perceived injury severity component of the Sports Injury Rehabilitation Beliefs Survey (SIRBS, Taylor and May, 1996 see Appendix 45) was used to measure participants' perceptions of injury severity. This 5 item, 7 point Likert scale is the only measure of perceived injury severity that has been developed in relation to sports injury. Principal components analysis of the SIRBS (Taylor and May, 1993; Taylor and May, 1996) demonstrated construct validity for the measure, however during these analysis cronbach alpha for the perceived injury severity component (α = .63, Taylor and May, 1993; α = .52, Taylor and May, 1996) were not satisfactory according to Nunnally's (1978) proposed criteria (e.g. >0.7). However, subsequent studies have demonstrated satisfactory internal reliability for the scale. Specifically, Bone and Fry (2006) utilised the SIRBS to explore the relationship between injured athletes perceptions of social support from their certified athletic trainers and their rehabilitation beliefs and reported a satisfactory internal reliability for the perceived injury severity component of the SIRBS (α = .71). Similarly, Lu and Hsu (2013) reported strong internal reliability for all

components of the SIRBS ahead of their study exploring the relationship between hope, social support and rehabilitation beliefs (Cronbach's α ranging from 0.81 to 0.90 across the five dimensions of the SIRBS). King-Chung Chan and Hagger (2012) modified the SIRBS to explore injury beliefs in a sample of injured police officers. Their modified version of the perceived injury severity component of the scale, in which the statements were altered to be applicable to police officers, demonstrated strong internal consistency with a cronbach α coefficient of .79. To date, these are the only studies that have utilised the perceived injury severity component of the SIRBS.

Social Support: Social Support Inventory for Injured Athletes (SSIA; Mitchell, Rees, Evans and Hardy, 2005 see Appendix 46): This 16 item measure was developed using a population specific sample and is the first measure of social support developed using injured athletes that measures the four support types outlined in chapter 2. Specifically, this measure contains subscales for esteem support, information support, emotional support and tangible support that have been identified previously in the injury response literature (Rees and Hardy, 2000). The scale was developed to measure participants perceived social support using a 5-point Likert scale ranging from 1 = not at all to 5 = a lot. Mitchell et al (2013) reported Cronbach's alpha scores for each subscale as: Esteem support (α = .85), informational support (α = .74), tangible support (α = .59) and emotional support (α = .61). Therefore, two of these (tangible support and emotional support) were not satisfactory (e.g. >0.7) according to the criteria proposed by Nunnally (1978). However, when used as an aggregate measure of global support, Rees et al (2010) reported satisfactory levels of internal reliability for the 16 item scale (α = .74 for study 1 and α = .82 for study 2). Indeed, Rees et al (2010) recommended that in relation to exploring the sports injury response adopting this scale as a global, aggregate, measure of social support is more applicable as injured athletes may not distinguish between the specific types of social support. In addition, to the researcher's best knowledge, Rees et al (2010) is the only previous study to specifically consider sports participation level in examining the stress-buffering effect of social support following injury. Therefore, given that the aim of this second stage was also to verify the convergent validity of the ERRUIS, it was considered more applicable to make closer comparisons to the Rees et al (2010)

study and employ this scale as an aggregate, global measure of social support as opposed to considering the subscales independently.

6.4.4 Procedure.

The procedure for this study was consistent with the procedure for the EFA study. Participants were presented with a participant information sheet (see Appendix 8) which detailed information about the study, their rights and the contact details of the researcher. This information was also given verbally to the participants. Following this, participants signed an informed consent form (see Appendix 12) re-iterating their rights and providing further instructions and information in relation to the study. Participants then completed a questionnaire pack containing the demographic questions, the modified ERRUIS, the perceived injury severity scale and the SSIA in that order. Participants were verbally told, by the researcher, to complete the questionnaires in the order presented. As with the EFA study, the researcher encouraged the participant to use their own interpretation if there were any question in relation to a meaning of an item on any of the scales. This was consistent with West and Roderique-Davies (2008) and used to avoid possible bias.

In line with the EFA study, completed questionnaires were collected by an independent third party and handed to the researcher in order to retain anonymity. Following completion of the questionnaire, participants were debriefed both verbally and in written form (see Appendix 16) and they were reminded of their ethical rights in relation to confidentiality and their rights to terminate that involvement at any stage. Participants were provided with both verbal and written background information pertaining to the emotional responses following injury and also provided with an email address of the researcher should they wish to discuss any questions both in relation to the study in general, its findings, and also their participation in the study.

6.4.5 Ethical Considerations.

In line with the previous studies reported in this thesis, ethical consent was approved by the University of Glamorgan Ethics panel prior to commencement and followed the ethical procedure outlined by the British Psychological Society (see Appendix 4). Participant information sheet and consent forms outlined the main aims of this study. Raising awareness of the aims of the study was essential as participants were asked to answer questions relating to their emotional feelings during their injury and questions in relation to perceived social support, this recall may lead to negative mood following the study. Additionally, the debrief sheet reiterated information pertaining to the study and advised participants to contact their GP for a referral in the event of experiencing distress.

The ethical rights of the participants in relation to the study were disclosed in the information and debrief form (see Appendices 8 and 16). This included their right to withdraw from the study, both during and after completing the study not having to declare any reason for withdrawal. As with the EFA study, participants were given up to three weeks after the completion of the questionnaire to request to withdraw from the study. This timescale was considered appropriate as a schedule was needed to commence the data analysis. This was made aware to the participants in the debrief form.

Consistent with the EFA study and to assure confidentiality and anonymity, should the participants have wished to withdraw or terminate their questionnaire from the data analysis, they would contact the researcher quoting the individual questionnaire number. In signing a consent form, the participants may disclose their name to the researcher. However, consent forms were securely stored by the principal researcher in a key locked cabinet. All information required for analysis was placed on a password protected computer with only the principal researcher having access to the computer. Any personal information that participants declared to the researcher was kept confidential and no specific information relating to an individual participant was discussed to anyone either verbally or in writing.

6.5 Data Analysis and Results.

6.5.1 Data Analysis – Stage 1.

The factorial validity of the ERRUIS was assessed via confirmatory factor analysis using AMOS 21 with maximum likelihood estimation. In light of the recommendations proposed by Jöreskog (1993) that has also been recommended in the field of sport psychology (Biddle et al, 2001) sequential model testing approach was used to guide the analysis and assess the model fit. Specifically, this approach further assesses the convergent validity of each subscale by firstly testing each separate, hypothesised, single factor model. Pairwise independence is next assessed through conducting pairwise analysis of each pair of hypothesised subscales. The final aspect of sequential model testing is to test the fit of the full hypothesised model. Prior to conducting the CFA, the data was inspected for skewness and kurtosis as significant univariate and multivariate skewness and kurtosis can have a major impact on the interpretation of model fit indices (Brown, 2006; Byrne, 2010; Kline, 2010). In addition, in line with recommendations suggested by Brown (2006) and Byrne (2010) parameter estimates, standardised residual matrices, modification indices, and standardised factor loadings were examined to investigate a misspecification in the model fit.

In relation to assessing the model fit in scale development, it has been recommended that a number of model fit methods of assessments are employed. Therefore, based on the recommendations of Byrne (2010) overall fit was assessed by the model χ^2 statistic, its associated p value and also the χ^2/df ratio. Schreiber et al (2006) stated that a non-significant χ^2 p value and/or a χ^2/df ratio of < 2.00 are indicative of good model fit. However, due to the limitations of using the model χ^2 to assess absolute fit, particularly in relation to its sensitivity to large sample size and non-normal distribution, the standardised root mean square residual (SRMR) was also adopted as a measure of absolute fit. Schreiber et al (2006) stated that an SRMR of $<.05$ was indicative of good model fit. Parsimony correction was measured through the root mean square error of approximation (RMSEA) and its associated '*p*fit' value, this is widely used in scale development studies

and is considered a very robust measure as it is robust in large sample sizes (Worthington and Whittiker, 2006). Schreiber et al (2006) suggested that an RMSEA of <.05 with a non-significant *p* value (*p*>.05) are indicative of good model fit. Byrne (2010) stated that the two most robust and consequently recommended comparative fit indices in scale development are the comparative fit index (CFI) and the Tucker-Lewis Index (TLI). Schreiber et al (2006) suggested a value of close to or greater than .95 for both the CFI and TLI would be indicative of a good model fit.

6.5.2 Results - Stage 1.

Analysis of univariate skewness and kurtosis suggested that the items did not deviate substantially from a normal distribution. However, in relation to multivariate analysis, Mardia coefficients revealed significant multivariate kurtosis (z = 35.728, p <0.001). As a consequence, the interpretation of the results is viewed with some caution.

Table 6.1 reports the standardised factor loadings and the single factor analysis of the hypothesised 52-item, 7 subscale, ERRUIS. As can be noted, the model χ^2 statistic was statistically significant (*p* <.05) for all of the subscales with the exception of anxiety (*p* = .742). The χ^2/df ratio of the single factor analysis also suggested poor model fit as only two of the subscales, positive emotions and anxiety, had a $\chi 2/df$ ratio of < 2.00. However, given sensitivity to sample size and kurtosis issues of using the model χ^2 it was important to consider the other assessment of fit indices prior to making decisions on model re-specification. According to the recommended values proposed by Schreiber et al (2006), six out of the seven subscales all attained 'good' fit in the remaining five assessments of model fit employed. Specifically, 'Anger/Frustration', 'Low/Depressive Feelings', 'Positive Emotions', 'Anxiety', 'Apathy/Boredom' and 'Confusion' were all indicative of good fit according to the RMSEA (<.05), its corresponding '*p*fit' value (p>.05), the SRMR (<.05), the CFI (>.95) and TLI(>.95). In addition as the standardised factor loadings for each item of each of these subscales was >.4, no standardised residual above 2.58 (Jöreskog and Sörbom, 1993) and the observation of the modification indices indicated no

significant parameter estimate change should an item be freely estimated. It was therefore considered that the six subscales demonstrated satisfactory convergent validity and model fit.

According to the recommendations of Schreiber et al (2006), the subscale 'fear' did not achieve a 'good' model fit in five of the seven assessments of model fit used. In addition to a significant model χ^2 statistic (p = .000) and a χ^2/df ratio greater than 2 (χ^2/df ratio = 5.529), the RMSEA (.078), CFI (.949) and TLI (.928) were not indicative of good fit according to the criteria recommended by Schreiber et al (2006). However the non-significant '*p*fit' value for the RMSEA (p = .056) and the SRMR value (.0380) was indicative of good fit according to Schreiber et al's (2006) criteria. Indeed, the RMSEA is in the range of 'mediocre' fit according to MacCallum et al (1996). Brown (2006) stated that an RMSEA of <.10 can be accepted providing other assessments of model fit used were also within the acceptable range. In relation to the CFI and TLI values, both are very close to the recommended .95 value of "good" model fit (Schreiber et al, 2006). Indeed, Bentler (1990) suggested that a CFI of >.90 can be considered acceptable providing other fit indices are within an acceptable range. Similarly, Schreiber et al (2006) stated a TLI of >.90 can also be considered acceptable providing other indices are within an acceptable range.

Given that two of the measurement of fit indices indicated a 'good' fit and three considered 'close' to a 'good' fit, careful consideration was given to the factor loadings, standardised residual matrix and modification indices in relation to model re-specification. As with the other six subscales, the standardised factor loadings for each item representing fear was >.4. In addition, the modification indices indicated no significant parameter estimate change should an item from 'fear' be freely estimated. Similarly, no standardised residual above 2.58 (Jöreskog and Sörbom, 1993) was observed in the standardised residual matrix. As the items for the subscale were considered 'essential' during the content validity stage of the EFA study and displayed initial construct validity with strong factor loadings following an EFA, the eight items of the fear subscale were cautiously retained.

The pairwise analysis and whole model fit of the ERRUIS is reported in Table 6.2. As with the single factor analysis, the model χ^2 statistic and its χ^2/df ratio was an issue in relation to model fit. Specifically, the model χ^2 statistic was significant in 17 of the 21 pairs in the pairwise analysis and also the whole model fit. However, as stated previously the sensitivity of the model χ^2 to large sample sizes and non-normality in the dataset was possibly a contributing factor to this value. In relation to the χ^2/df ratio, values greater the 2, indicative of poor model fit, was reported in six of the pair of subscales. Perhaps unsurprisingly given the findings of the single factor analysis, each of these six pairs involved the 'fear' subscale. However, for all of the pairs the other five indices of model fit were all indicating 'good' model fit according to Schreiber et al's (2006) criteria. In relation to the whole model fit it was only the statistically significant model χ^2 value that was not indicative of model fit, the remaining six measures all suggested good model fit. Analysis of the standardised residuals matrices and modification indices also suggested that the model was of good fit. Therefore, the hypothesised 52 item, 7 subscale ERRUIS that had undergone previous exploratory factor analysis was considered of 'good' fit and all the items were retained. A figure of the path diagram, as produced by Amos 21, with pathway covariance values of the ERRUIS can be seen in Appendix 48. Cronbach α coefficient for each of the subscales in the finalised model was 'Anger / Frustration' α = .887, 'Positive Emotions' α = .897, 'Anxiety' α = .911, 'Low / Depressive feelings α = .891, 'Apathy / Boredom α = .915, 'Confusion' α = .895 and 'Fear' α = .909 (see Table 6.3).

Table 6.1 *Single Factor Fit Statistics and Factor Loadings for the ERRUIS.*

Factor/Items	Loading	χ^2	*Df*	$p(\chi^2)$	χ^2/df	RMSEA	RMSEA *p* value	SRMR	CFI	TLI
Anger		42.284	20	.003	2.114	.0530	.389	.0271	.984	.977
Q44 I feel more impatient since my injury	.767									
Q17 I have felt angry with myself about my injury	.743									
Q22 I have felt annoyed at my recovery progress	.729									
Q49 I find it difficult to keep calm since my injury	.726									
Q47 I have felt tense since my injury	.697									
Q51 Since my injury I have felt frustrated	.695									
Q9 Since my injury I have been angry with others	.647									
Q1 Since my injury I feel more irritable	.624									
Low/Depressive Feelings		43.033	20	.002	2.152	.0540	.364	.0253	.985	.979
Q43 Since my injury there have been times where I have felt low	.860									
Q24 Since the injury I have felt worthless	.782									
Q39 I have felt quite down since my injury	.750									
Q7 Since the injury I have lost interest in everything	.747									
Q34 Since the injury I feel more lonely	.688									
Q30 Since the injury I feel more sorry for myself	.683									
Q37 There have been times where I have felt depressed about my recovery progress	.612									
Q14 Since the injury I feel like I cannot help myself in anyway	.588									
Positive Emotions		27.150	14	.0180	1.939	.0480	.500	.0218	.991	.986
Q31 I have felt optimistic about my recovery progress since my injury	.807									
Q15 There have been times when I have felt a sense of joy since my injury	.798									
Q3 I have felt disappointed about my recovery progress*	.763									
Q4 Since my injury, there have been times where I have felt sad*	.759									
Q28 There have been times when I have felt a sense of relief since my injury	.747									

Table 6.1 *Continued*

Factor/Items	Loading	χ^2	*Df*	$p(\chi^2)$	χ^2/df	RMSEA	RMSEA *p* value	SRMR	CFI	TLI
Q19 I have felt happy about my recovery progress	.742									
Q29 There have been times when I have had a feeling of euphoria since my injury	.603									
Anxiety		10.273	14	.742	.734	.000	.992	.0116	1.000	1.003
Q42 Since the injury I have felt contented with my recovery progress*	.837									
Q12 I have suffered from panic attacks since my injury	.831									
Q8 Since my injury I have felt more stressed than normal	.824									
Q6 Since my injury I have felt anxious about my recovery progress	.786									
Q2 I worry a lot since my injury	.769									
Q33 I have felt calm since my injury*	.709									
Q27 Nothing has concerned me since my injury*	.649									
Fear		110.588	20	.000	5.529	.078	.056	.0380	.949	.928
Q16 Since my injury I have felt scared about my future	.802									
Q23 Since my injury I have felt fearful about not making a full recovery	.795									
Q38 Since my injury there have been times when I fear a re-injury	.786									
Q36 The consequences of my injury do not concern me*	.783									
Q20 There have been times when I dread to think about what is going to happen	.735									
Q35 There have been times when I have felt frightened about the consequences of this injury	.710									
Q10 Since my injury I have felt calm when thinking about the future*	.682									
Q40 Since my injury I have felt fearful about a return to sport	.673									
Apathy/Boredom		29.525	14	.009	2.109	.053	.399	.0226	.987	.991
Q13 Since the injury I feel it is hard to maintain an interest in my recovery	.863									

Table 6.1 *Continued*

Factor/Items	Loading	χ^2	*Df*	$p(\chi^2)$	χ^2/df	RMSEA	RMSEA *p* value	SRMR	CFI	TLI
Q48 Since my injury I get easily distracted	.860									
Q11 Since my injury I have been focused on my recovery*	.815									
Q21 Since the injury there have been times where I felt no enthusiasm to recover	.786									
Q5 Since my injury there are times in which I do not care about my recovery	.743									
Q26 Since my injury I get bored easily	.716									
Q46 Since the injury there have been times where my recovery is not high on my priorities	.674									
Confusion		31.057	14	.005	2.218	.055	.339	.0232	.983	.989
Q18 I feel confused about my recovery progress	.923									
Q52 At times I feel like I have more questions than answers about my injury	.822									
Q50 Since my injury I don't know what the future holds	.729									
Q25 Since my injury I have always understood clearly about the severity of my injury*	.725									
Q32 Since my injury I feel that I do not know what is going on	.717									
Q41 I have felt composed and clear when has come to making decisions about my injury*	.714									
Q45 Since my injury I have days where my mind seems elsewhere	.572									

* Denotes reversed scored items.

Table 6.2 *Fit Statistics for Two-Factor Models and Full Model for the ERRUIS.*

Factors	χ^2	*Df*	$p(\chi^2)$	χ^2/df	RMSEA	RMSEA *p*	SRMR	CFI	TLI
Anger/Frustration and Positive Emotions	132.883	89	.002	1.493	.035	.982	.0408	.984	.982
Anger/Frustration and Anxiety	103.119	89	.145	1.159	.020	1.000	.0349	.995	.994
Anger/Frustration and Low/Depressive Feelings	170.617	103	.001	1.656	.040	.930	.0428	.977	.973
Anger/Frustration and Apathy/Boredom	115.831	89	.030	1.301	.027	.999	.0319	.991	.990
Anger/Frustration and Confusion	138.920	89	.001	1.561	.037	.963	.0395	.983	.980
Anger/Frustration and Fear	236.402	103	.001	2.295	.057	.116	.0432	.958	.951
Positive Emotions and Anxiety	116.644	76	.002	1.535	.037	.960	.0389	.987	.984
Positive Emotions and Low/Depressive Feelings	150.061	89	.001	1.686	.041	.893	.0355	.980	.976
Positive Emotions and Apathy/Boredom	100.835	76	.030	1.327	.029	.996	.0347	.992	.991
Positive Emotions and Confusion	123.562	76	.001	1.626	.040	.916	.0365	.984	.981
Positive Emotions and Fear	196.377	89	.001	2.206	.055	.212	.0368	.967	.961
Anxiety and Low/Depressive Feelings	111.339	89	.055	1.251	.025	.999	.0351	.993	.992
Anxiety and Apathy/Boredom	99.548	76	.036	1.310	.028	.997	.0326	.993	.992
Anxiety and Confusion	89.848	76	.132	1.182	.021	1.000	.0301	.996	.995
Anxiety and Fear	173.906	89	.001	1.954	.049	.559	.0343	.975	.971
Low/Depressive Feelings and Apathy/Boredom	134.438	89	.001	1.511	.036	.978	.0310	.986	.983
Low/Depressive Feelings and Confusion	131.616	89	.002	1.479	.035	.985	.0394	.986	.984
Low/Depressive Feelings and Fear	235.143	103	.001	2.283	.057	.125	.0407	.961	.954
Apathy/Boredom and Confusion	96.093	76	.060	1.264	.026	.996	.0292	.994	.993
Apathy/Boredom and Fear	218.901	89	.001	2.460	.060	.051	.0348	.963	.956
Confusion and Fear	206.883	89	.001	2.325	.057	.111	.0368	.965	.958
Full Model : 52 Item version	**1600.905**	**1253**	**.001**	**1.278**	**.026**	**1.000**	**.0430**	**.970**	**.968**

6.5.3 Data Analysis – Stage 2.

Based on the recommendations proposed by Cohen and Wills (1985) and Biddle et al (2001), moderated hierarchical regression analysis was employed to examine the relationships between injury severity, social support and the emotional responses. According to Rees and Hardy (2004) this is the most appropriate method for assessing the stress-buffering hypothesis of social support in relation to sport. Consistent with the recommendations of Biddle et al (2001), to improve the interpretation of the interaction term, all variables were firstly standardised. This took place prior to the formation of the product terms. In line with the testing of the social support buffering hypothesis (Biddle et al, 2001), the predictor variables were entered into the hierarchical model via a three-step process that comprised three blocks. The first predictor variable, injury severity, was entered in the first block. Social support was entered into the second block, as this was hypothesised to be the moderating variable. The main effect of these variables was reflected in the percentage of total variability explained by each variable (R^2). The product term of social support and perceived injury severity was entered in the third block, together with the two hypothesised main effects variables (injury severity and social support) as recommended by Biddle et al (2001). In this case, a significant change in R^2 would reflect an interaction and provide support for the buffering hypothesis. Consistent with Mitchell et al (2013), the alpha level for all statistical tests was set at .05.

6.5.4 Results – Stage 2.

Means, standard deviations, Cronbach alpha coefficients, and inter item correlations using Pearson's correlation coefficient for all subscales incorporated in this study are in Table 6.3.

Prior to conducting the moderated hierarchical regression, assumptions for regression were tested and satisfied. Across all models there were no standardised residuals >2.58 (58 (Jöreskog and Sörbom, 1993). Inter-correlations between all variables were not greater than .80 (Field, 2013, see table 6.3), variance inflation factor (VIF) values were all below

10, with average VIF values not substantially greater than 1 (Stevens, 1996). Tolerance values for the VIF were above .2 (Field, 2013). In relation to the correlation between residuals, the values for the Durbin-Watson test for each model were close to 2 and within the acceptable range of greater than 1 and less than 3 (Field, 2013). The values for the Durban-Watson statistic for each model ranged from 1.785- 1.983. This satisfied the assumption of independent errors. In addition, the residuals were normally and evenly distributed (each with a mean of 0), therefore satisfying assumptions of normal distribution errors, linearity and homoscedasticity.

Table 6.3 *Means, standard deviations, coefficient alphas, and inter-correlations for all scales.*

Scale	Mean	SD	α	1	2	3	4	5	6	7	8	9
Injury Severity	13.65	4.74	.734	-	-.127**	0.052	-.174**	.223**	.249**	-0.049	.148**	.370**
Social Support	47.12	12.09	.835	-.127**	-	-.220**	.192**	-.328**	-.312**	-.097*	-.518**	-.218**
Anger/ Frustration	23.95	6.65	.887	0.052	-.220**	-	-.243**	.313**	.228**	.118**	.259**	.260**
Positive Emotions	20.52	5.76	.897	-.174**	.192**	-.243**	-	-.373**	-.348**	-0.072	-.222**	-.358**
Anxiety	20.47	6.34	.911	.223**	-.328**	.313**	-.373**	-	.313**	.112*	.415**	.391**
Low/ Depressive Feelings	22.66	6.91	.891	.249**	-.312**	.228**	-.348**	.313**	-	0.044	.305**	.418**
Apathy / Boredom	21.39	5.97	.915	0.164	0.026	.118**	-0.072	.112*	0.044	-	.156**	.097*
Confusion	20.64	6.56	.895	.148**	-.518**	.259**	-.222**	.415**	.305**	.156**	-	.336**
Fear	23.12	8.18	.909	.370**	-.218**	.260**	-.358**	.391**	.418**	.097*	.336**	-

N = 402 Note: *Denotes correlation significant at .05 level (1-tailed).
**Denotes correlation significant at .01 level (1-tailed).

Table 6.4 describes the results from the moderated hierarchical regression analysis. Specifically, there were significant main effects for injury severity in relation to 'Positive Emotions' (R^2 = .030, B = -.174, p =.0001), 'Anxiety' (R^2 = .050, B = .184, p =.0001), 'Low / Depressive Feelings' (R^2 = .062, B = .208, p =.0001), 'Confusion' (R^2 = .022, B = .148, p =.003) and 'Fear' (R^2 = .137, B = .341, p =.0001). Each of these effects were in the hypothesised directions. The unstandardised regression coefficient suggested that injured recreational level athletes with high perceived injury severity are more likely to experience a higher frequency of 'Anxiety', 'Low / Depressive feelings', 'Confusion', 'Fear' and a lower frequency of 'Positive Emotions'. Perhaps surprisingly, there was no significant main effect for injury severity in relation to 'Anger / Frustration' and 'Apathy / Boredom'.

In addition, there were significant main effects for social support in relation to all of the subscales of the ERRUIS. Specifically: 'Anger / Frustration' (ΔR^2 = .046, B = -.216, p =.0001), 'Positive Emotions' (ΔR^2 = .029, B = .173, p =.0001), 'Anxiety' (ΔR^2 = .091, B = -.304, p =.0001) 'Low / Depressive Feelings' (ΔR^2 = .080, B = -.280, p =.0001), 'Apathy / Boredom (ΔR^2 = .011, B = -.100, p =.037), 'Confusion' (ΔR^2 = .253, B = -.508, p =.0001) and 'Fear' (ΔR^2 = .030, B = -.167, p =.0001) These were over and above the variance accounted for by injury severity. Each of these effects were in the hypothesised directions. Specifically, the unstandardised regression coefficient suggested that injured recreational level athletes with high social support are more likely to experience lower frequencies of 'Anger / Frustration', 'Anxiety', 'Low / Depressive feelings', 'Apathy / Boredom', 'Confusion', 'Fear' and a higher frequency of 'Positive Emotions'. In addition, the moderated hierarchical analysis demonstrated no significant change in R^2 in the third model (product), suggesting no significant interaction between injury severity and social support in relation to the emotional responses (sig Figure 6.1). Therefore, as a consequence, there was some support for hypothesis 1 and 2, but no support for the stress-buffering effect (hypothesis 3).

Table 6.4 *Moderated hierarchical regression analyses: Effects of perceived injury severity, social support and products on the emotional responses following injury*

Model	Dependent Variable	Independent Variable	$\Sigma R^{2\,a}$	$\Delta R^{2\,b}$	$p(f)^{c}$	B^{d}	$p(t)^{e}$
1	Anger / Frustration	Injury Severity	.003	.003	.303	.052	.303
		Social Support	.049	.046	.001	-.216	.001
		Product	.051	.002	.374	-.042	.374
2	Positive Emotions	Injury Severity	.030	.030	.001	-.174	.001
		Social Support	.069	.029	.001	.173	.001
		Product	.073	.004	.191	.061	.191
3	Anxiety	Injury Severity	.050	.050	.001	.184	.001
		Social Support	.141	.091	.001	-.304	.001
		Product	.141	.000	.925	.004	.925
4	Low / Depressive Feelings	Injury Severity	.062	.062	.001	.208	.001
		Social Support	.142	.080	.001	-.280	.001
		Product	.145	.003	.223	.053	.223
5	Apathy / Boredom	Injury Severity	.002	.002	.329	-.067	.184
		Social Support	.013	.011	.037	-.100	.037
		Product	.017	.004	.234	.057	.234
6	Confusion	Injury Severity	.022	.022	.003	.148	.003
		Social Support	.275	.253	.001	-.508	.001
		Product	.276	.001	.595	.022	.595
7	Fear	Injury Severity	.137	.137	.001	.341	.001
		Social Support	.167	.030	.001	-.167	.001
		Product	.174	.007	.060	.083	.060

N = 402 – Note: All variables standardised except for product. Product was formed from the sum of injury severity (standardised) and social support (standardised) variables.

[a] Cumulative R^2.

[b] Stepwise change in R^2.

[c] Probability of F for ΔR^2.

[d] Unstandardised regression coefficient (B) in final equation.

[e] Probability of t for B.

6.6 Discussion.

A confirmatory factor analysis of the ERRUIS was conducted to advance the development of a population specific measure to assess the frequency of the emotional responses following injury in recreational rugby union players. The results of the sequential confirmatory factor analysis demonstrated adequate fit for the 52 item, 7 factor structure that was reported in chapter 5 and provided further support for the ERRUIS as a measure of the frequency of emotional responses experienced by recreational rugby union players following injury. This scale was originally developed in response to Evans et al's (2006) recommendation for researchers to devise a population specific measure of the emotional response following injury. The four original studies noted in this thesis were essential to the overarching aim of this thesis noted in section 1.6, of which the development and initial validation of the ERRUIS was the final product. As a consequence, a measure that can accurately assess the frequency of emotional responses following injury is potentially essential for researchers and rehabilitation professionals to design intervention strategies that can enhance more positive behavioural responses, leading to a return to sports participation.

Multiple assessments of model fit were used including absolute fit indices, parsimony correction indices and comparative fit indices. The selection of fit indices was based on the recommendations of Byrne (2010). However, two of these assessments, namely the model $\chi 2$ value and the $\chi 2$/df ratio, were often not indicative of good model fit particularly in relation to assessing each single factor structure. Indeed, only two of the hypothesised factor structures ('Positive Emotions' and 'Anxiety') were indicating a good model fit based on the model $\chi 2$ value and the $\chi 2$/df ratio alone. However, given the sensitivity to sampling and data normality of these two values, these findings in relation to scale development assessment are often viewed with caution (Schreiber et al, 2006). This would appear to be the case for this study, given the large sample size (based on Harrington's 2009 criteria) and evidence of multivariate kurtosis reported with the data.

In six of the seven subscales of the ERRUIS, the values of the remaining five measures of model fit indicated a good model fit in the single factor structure according to the fit criteria recommended by Schreiber et al (2006). However, for the hypothesised 'Fear' subscale was not considered a 'good' fit in three of these five measures; specifically the RMSEA, the CFI and the TLI. However, it was worth considering that the scores for the 'Fear' subscale was within Brown's (2006) 'close to' value for these three measures. In addition, consideration to the factor loadings, modification indices and standardised residual matrix suggested that hypothesised eight items that represented 'Fear' could be cautiously retained. Pairwise and whole model analyses also suggested that the 52 item, 7 factor structure as reported in chapter five should be retained.

The principal aim of a CFA is to confirm a hypothesised structure, for this study the hypothesised model was derived following extensive qualitative research, content validity testing, pilot work and an exploratory factor analysis. This background work, including consideration for the findings of the EFA which led to the reduction of the original scale, enabled the researcher to form a hypothesis of a 52 item, 7 factor scale prior to the CFA. Such time-consuming work is considered essential in the development of a new measure (Rattray and Jones, 2007) and providing the original EFA revealed a clear structure then it is plausible to expect little change in a confirmatory procedure as EFA and CFA involve similar mathematical procedures (Harrington, 2009).

The homogeneity of the participants involved in the EFA study and the CFA study is one plausible explanation as to why the hypothesised structure was considered an acceptable fit. Hurley et al (1997) suggested that researchers could be more confident in predicting a hypothesised structure during scale development if the sampled used in the confirmatory factor analysis was a similar population to that used at the earlier stages of scale development. As noted, the sport participation levels and current activity were the same for participatns in both studies (e.g. injury recreational level rugby union players). In addition, similar injuries were reported between the participants in the two studies (see Appendices 43 and 47). Furthermore the mean age and gender ratio of the two groups of

participants were also similar. Despite, both the EFA and CFA studies suggesting adequate content and construct validity of the ERRUIS, it is important to note that the validity testing of a scale is a continual process and researchers need to re-assess the validity of a measure relative to a specific sample (e.g. Lundqvist and Hassmen, 2005).

In comparing the factor loadings of the CFA and the EFA study of the 52 item ERRUIS, some interesting differences in the factor structure were noted between the two studies. For example in the EFA study, the item with the highest loading on the 'Low / Depressive Feelings' subscale ('There have been times where I have felt depressed about my recovery progress') was actually the second lowest loading item of the subscale in the CFA analysis. Similarly, the lowest loading item of the 'Positive Emotions' subscale in the CFA analysis ('There have been times when I have had a feeling of euphoria since my injury') was the second highest loading item in the EFA analysis. In relation to the 'Anxiety' subscale, the highest loading item in the EFA study ('Nothing has concerned me since my injury') was the lowest loading item in the CFA study for this subscale. Also, the highest loading item in the 'Confusion' subscale in the CFA study ('I feel confused about my recovery progress') was actually the lowest loading item in the previous EFA study for the subscale. Given the high internal reliability coefficients for each of the subscales and the high factor loadings for all items of the finalised ERRUIS in both the EFA and CFA studies, these differences are not a major cause of concern in relation to the validity and reliability of the scale. Nevertheless, these differences would suggest that continual measures of factor structure of the scale is necessary to further establish which items most closely represent each subscale.

Comparison between the inter-factor correlations of the ERRUIS in both the study 3 and study 4 demonstrated interesting findings. In the EFA study, widespread significant correlations were reported in the hypothesised direction at the $p<0.01$ level. Specifically, a strong positive correlation was found between the frequency of the negative emotional responses experiences, namely 'Anger / Frustration', 'Low / Depressive Feelings', 'Anxiety', 'Fear', 'Apathy / Boredom', and 'Confusion'. In addition, there was a negative

correlation, at the $p<0.01$ level, between the frequency of positive emotions experienced following injury and the frequency of five negative emotions as measured in the ERRUIS. Specifically: 'Anger / Frustration', 'Low / Depressive Feelings', 'Fear', 'Apathy / Boredom', and 'Confusion'.

However, in the CFA study there were some slight differences noted in the inter-factor correlations. Specifically, there was no significant correlation between the 'Low / Depressive Feelings' and 'Apathy / Boredom' subscales. In addition, there was no significant correlation between the 'Positive Emotions' and 'Apathy / Boredom' subscales although in this instance there was a significant negative correlation, at the $p<.01$ level, between the 'Positive Emotions' and 'Anxiety' subscale. This would provide further support for Lazarus' CMRT as these findings suggest that emotions are transient in nature and based on the individual's appraisal of the situation which can be influenced by a number of personal and situational factors. In addition, as previously discussed, there has been very little existing research examining the experience of apathy and boredom following injury. The inter-factor correlations involving this subscale were quite different for the CFA data set in comparison to the previous EFA study, further research is especially needed exploring the relationship between this subscale and the other emotional responses following injury.

Through exploring factors postulated by Wiese-Bjornstal et al (1998) that are thought to influence the emotional responses following injury, stage 2 of this study was essential to the overarching aims of this programme of research noted in section 1.6. Not only did this stage provide convergent validity of the ERRUIS, but it also was the first study to quantitatively measure aspects of the Wiese-Bjornstal model using a population specific measure of emotional response. The specific aim of stage 2 of this study was to examine the main effect relationship of perceived injury severity and social support on the emotional responses in injured recreational level rugby union players. In addition, to explore the stress-buffering hypothesis between social support and the emotional responses following injury.

The results of this study suggested that both social support and perceived injury severity influence the frequency of emotional responses experienced in injured recreational level rugby union players. Specifically, the moderated hierarchical regression analysis reported that perceived injury severity was positively associated with the frequency of 'Anxiety', 'Low / Depressive Feelings', 'Confusion', and 'Fear'. Specifically, those injured athletes who perceived their injury to be severe were more likely to report a greater frequency of the above emotions experienced. In addition, a negative relationship was associated between perceived injury severity and 'Positive Emotions', with those injured athletes who perceived their injury to be severe less likely to report high frequency levels of positive emotions experienced during the injury period. This was also in the hypothesised direction and provides further support for the impact that injury severity can have on the injury response. Indeed, previous studies have stated that while obtaining a sports injury can be a great source of stress, the severity of the injury is highly correlated to injured athletes levels of stress, suggesting the injury severity levels as being a source of stress in its own right (Malinauskas, 2010). As the ERRUIS includes a number of subscales that have not been accounted for in previous subscales, to the researcher's knowledge this is the first quantitative study that has reported a link between perceived injury severity and the experience of positive emotions, confusion and fear following injury. In relation to the feelings of anxiety and low / depressive feelings, the findings provide support for previous quantitative studies that have reported a link between these two responses and injury severity levels (e.g. Smith et al, 1990b; Smith et al, 1993; Mainwairing et al, 2010).

Interestingly, no significant main effect was reported between perceived injury severity and the frequency in both the 'Anger / Frustration', and 'Apathy / Boredom' subscales of the ERRUIS. As highlighted, very little research has been previously conducted examining the experience of apathy and boredom following injury. Whilst it could be postulated that the more serious the injury the more incapacitated the athlete will be, which could lead to increases in boredom, it could also be stated that athletes with more serious injuries may have more of an active rehabilitation process. In such cases, it could be postulated that greater frequency of boredom might be experienced by the less severely injured athlete.

Furthermore, whilst the athlete might perceive their injury as severe in relation to sports participation, the measure of perceived injury severity did not incorporate a subscale relating to the everyday functioning. For recreational level athletes, if the injury only impedes their recreational sports participation, but has no bearing on the rest of their functioning (such as employment), then it may influence their levels of boredom. In addition, in relation to apathy it could be presumed that the more serious the injury the more interested and passionate the participant would be in relation to the recovery. However, given the lack of empirical research exploring the experience of these emotions following injury, the possible explanations for these findings are merely presumptions that require further research.

The non-significant main effect relationship between injury severity and the frequency of anger and frustration experienced following injury was perhaps more surprising given that a limited number of studies have reported a relationship previously (e.g. Smith et al, 1990a). The findings of this study, reiterates the need to further investigate factors that are thought to influence the experience of anger. One of the many personal factors thought to influence the emotional response following injury according to the Wiese-Bjornstal et al (1998) model is personality. Indeed, Ekenman et al (2001) reported that athletes with type A personality traits were more likely to develop overuse sporting injuries compared to athletes who displayed type B personality traits. One such behavioural characteristic of type A personality is sensitivity to display anger and frustration. Consequently, it could be postulated that in to relation anger and frustration, other factors, including personality need to be accounted for. In other words, it could be stated that other factors, such as personality, can have a moderating influence on the emotional response of anger and frustration following injury. Additionally, Gayman and Crossman (2003) suggested that the timing of the onset of injury can have an important role in the emotional response following injury. For example, feelings of anger and frustration were more salient at both the pre-season and also towards the end of the season, particularly if the team is competing for end of season honours. Gayman and Crossman (2003) concluded that the timing of the onset of injuries could be considered as important a predictor of the emotional response as

injury severity, particularly in relation to anger and frustration. This further highlights the transient, complex, nature of the emotional responses following injury and that researchers need to consider as many aspects as possible when examining factors that may influence the emotional response.

With regards to social support, the findings of the study reported significant main effects in relation to the frequency of all of the emotional responses measured by the ERRUIS. Specifically, athletes with higher perceived availability of social support networks were more likely to report reduced frequency of detrimental, negative, emotions following injury and a higher frequency of positive emotions. Conversely, athletes with lower perceived availability of social support networks were more likely to report higher frequencies of negative emotions and a lower frequency of positive emotions following injury.

This provides further support for the Wiese-Bjornstal et al (1998) model and highlights the important role that social support can have in influencing the frequency of emotional responses following injury. In addition, this also provides further support for the convergent validity of the ERRUIS. Whilst it has been stated that more research is needed to explore the exact nature of the relationship between social support and the emotional responses following injury, in other words why or how does social support provision impact on the emotional responses in injured athletes (Arvinen-Barrow and Pack, 2013), it is widely accepted that social support provision can influence the emotional responses following injury (Evans et al, 2006). This study also furthered knowledge about the applicability of the stress-buffering effects of social support on emotional responses following injury.

Rees et al (2010) reported evidence for the buffering effect of social support in the relationship between stressors and the psychological response following injury in low level athletes. However, this present study did not report a buffering effect of social

support in relation to the stress and emotional response relationship. Given the different measures of 'stress' used in addition to the different measures of injury response, it would be inappropriate to directly compare the findings of these two studies. However, Rees et al (2010) suggested that elite level athletes invest more into their sport participation, have a stronger sense of athletic identity and active participation is a critical source of self-worth (Green and Weinberg, 2001). Therefore, for such athletes, social attachments will play a critical part in maintaining positive psychological responses irrespective of the level of stress experienced. Whereas for the low level participants, there is less investment involved in their sport and therefore, Rees et al (2010) suggested, that social support will play a more prevalent role in reducing detrimental psychological responses only in circumstances where high stress is experienced.

However, in contrast to Rees et al (2010), this study did not report stress-buffering effects of social support in relation to the emotional responses following injury in recreational level rugby union players. The previous research that has been conducted as part of this thesis has highlighted that, despite the low sports participation level, recreational players do also make investment to the sport and sports injury can impact on their identity and the attachments. As reported in chapter 3, some of the recreational level athletes described their sport as a time where they could be themselves and sports participation was an important aspect of their lives and their well-being. The injury was a significant source of stress and this had a major impact on their emotional response. Consequently, as study 1 highlighted that recreational level athletes can make substansial personal investments to their sport and have high athletic identity, it was perhaps inaccurate of Rees et al (2010) to reach this conclusion as there had been very little research in this specific area previously.

Another explanation for why the stress-buffering effect of social support on the emotional responses following injury was not supported may relate to the measure used in this study to assume stress. Whilst the links between injury severity and the experience of stressors have been empirically tested (e.g. Malinauskas, 2010) and the relationship between perceived injury severity and stress levels have been widely accepted in the sports injury

literature (Evans et al, 2006), in hindsight it may not have been appropriate to assume that participants who reported high levels of perceived severity were also experiencing high stress levels. Mitchell et al (2013) stated the stressors that can be experienced as a result of sports injury are widespread and injury severity is just one of several aspects relating to the injury that can influence the stress levels experienced. For example, as suggested previously the timing of the onset of the injury can be as much a source of stress as the actual injury severity (Gayman and Crossman, 2003). As a consequence, it may have been more appropriate to have used a scale that measures stressors and stress levels directly, as opposed to using a factor that is highly correlated with stress levels when injured. Nevertheless, it should be noted that the tool Rees et al (2010) and Mitchell et al (2013) employed to measure stressors was not developed and tested using a population specific sample; in addition this tool has not undergone any psychometric testing. Therefore, results using this measure should be viewed with some caution.

Despite the analysis not supporting the stress-buffering hypothesis of social support, the moderated hierarchical regression may further enhance our understanding of the specific nature of how social support impacts on the emotional response following injury. When entered first in the hierarchical regression, perceived injury severity was associated with a higher frequency of detrimental emotional responses, plus a lower frequency of positive emotions. However, over and above this variance, social support was associated with a lower frequency of detrimental emotional responses and a higher frequency of positive emotions. Therefore, the beneficial main effects of social support may have off-set the detrimental impact of high perceived injury severity on the emotional responses following injury. Wheaton (1985) suggested that social support acts as an independent deterrent of the impact of stress. In other words, Wheaton (1985) suggested that social support directly counterbalances any detrimental relationship between stressors (and stress levels) and the responses; this could be done via its influence upon intermediate, indirect mechanisms, such as improving confidence levels or altering the appraisal. Whilst Wheaton was not an advocate of the stress buffering hypothesis, it could be argued that the counterbalancing role that social support can have regarding the relationship between stressors and

responses is, in essence, part of the stress-buffering hypothesis. Indeed, Evans et al (2006) stated that the main effects and stress-buffering role of social support should not be seen as something that it mutually exclusive.

However, this conclusion may lead to a potential quandary in relation to future research exploring the stress-buffering effect of social support in relation to sports injury response. Thus far, to the researcher's best knowledge, there have been three studies that have used moderated hierarchical multiple regression to explore the stress-buffering effect of social support on the psychological or emotional responses following injury. Namely: Rees et al (2010), Mitchell et al (2013) and this present study. In relation to the interactive effects of social support and the stressors, these studies have yielded inconsistent findings. For example, Rees et al (2010) observed only a stress-buffering effect for the low level athletes and no buffering effect was reported when low and high level participants were analysed simultaneously, whereas Mitchell et al (2013) reported an interaction (a buffering effect) irrespective of the participation level. Conversely this study only reported a significant main effect of social support in relation to the emotional responses following injury in recreational level rugby union players with no support for the buffering hypothesis. Therefore, it could be stated that all three studies have come to very different conclusions in relation to the buffering effect.

Cohen and Wills (1985) stress-buffer hypothesis proposes that social support can moderate the relationship and, as a consequence, moderated regression analysis has been considered the most appropriate tool to measure this hypothesis (Biddle et al, 2001). However, given that Mitchell et al (2013) stated that it is not uncommon for researchers using moderated hierarchical regression not to detect and report the stress-buffering effect and Wheaton (1985) summation suggested a slightly different role of social support, perhaps it is feasible to consider that the role of social support on the emotional response following is more complex than just the buffering effect.

In the health psychology field, proponents of the stress-buffering hypothesis have discussed the mediating role that social support has on the relationship between stress and the responses. For example, Hobfoll and Walfisch's (1984) qualitative study of women pre and post screening for cancer suggested the social support had a mediating influence of the relationship between stress and the response (e.g. anxiety and depression levels). Whilst the authors suggested that all of the women interviewed prior to the cancer screening test were experiencing heightened levels of stress, those with strong support networks would not display as high a level of anxiety and depression levels. Therefore, they concluded that social support mediates the negative impact of stress on the response. Similarly, Grassi, Nappi and Molinari (1987) reported a similar effect of social support in relation to depression levels pre breast cancer biopsy tests. What these authors report is the mediating, and not moderating, impact of social support in relation to the responses to stress. Furthermore, in mainstream psychology, several researchers proposed interpretation of Cohen and Wills (1985) stress-buffering model outline the mediating impact of social support on the stress response (Brissette, Scheier and Carver, 2002; Aneshensel, 1992). Whilst the interpretation of the stress-buffering hypothesis in relation to sports injury response, proposed by Rees (2007), represents a moderation relationship, given the inconsistencies of the empirical research in this field, it may be feasible to explore a mediation role of social support in relation to the emotional responses following injury.

6.6.1 Limitations to the study and future directions.

In relation to the stage 1 of the study, the confirmatory factor analysis provided further support in the construct validity of the ERRUIS. The development of a population specific measure of the emotional responses following injury has been recommended in the research literature as there has been a growing concern that a number of recent qualitative studies have questioned the content validity and applicability of non-population specific measures of injury response (Evans et al, 2006; Evans et al, 2008). Whilst some caution is needed in the interpretation of the assessment of model fit due to the significant level of multivariate kurtosis, overall it was felt that the multiple methods of assessing model fits

employed was a strength of this study and the findings suggested a good fit for the hypothesised scale. Indeed, the Cronbach alpha coefficient and high factor loadings for each subscale, in both the EFA and CFA studies, suggest a good level of internal reliability in addition to high content and construct validity.

Nevertheless, whilst the second stage of the study demonstrated the convergent validity of the scale, tests of its predictive validity are still recommended during the validation of a scale (Rattray and Jones, 2007). In essence, the emotional responses following injury is an outcome measure of a specific scenario and therefore measuring its predictive validity, in the truest most direct sense, would be a time-consuming and problematic task to undertake. In a true assessment of predictive validity, more research would be needed to be undertaken on relatively stable factors, thought to influence the emotional response, which do not necessarily change as a consequence of the injury. As a result of their scores on the stable factor, it may be plausible to predict how the participant is likely to respond emotionally after the injury has taken place. One such factor may be the personality trait hardiness (Kobasa, 1979). This has been described as a relatively stable personality characteristic that comprises of three dispositions, namely commitment, control and challenge (Ouellette, 1993). Kobasa (1979) proposed that individuals who are high in hardiness are more likely to buffer the detrimental effects of stress on their responses. In addition, it has been suggested that in relation to sports injury response, injured athletes who are high in hardiness are more likely to experience a complete recovery from injury in a rapid time compared to injured athletes with lower levels of hardiness (Gould, Prentice, Petlichkoff and Tedeschi, 2000). In relation to the psychological response following injury, Wadey et al (2012a and b) reported that individuals high in psychological hardiness were more likely to report lower detrimental psychological responses following injury compared to injured athletes with reporting lower levels of psychological hardiness.

Given that hardiness is considered relatively stable, it may be plausible to predict the emotional responses following injury based on the individuals hardiness levels prior to them obtaining an injury. This, in essence, would be a true assessment of the predictive

validity of the ERRUIS. However, Nor and Anizu (2001) stated that the number of empirical research exploring the effects on hardiness in sports injury is very limited and recommended more research is needed before making bold theoretical hypothesis about its impact. This is particularly applicable to the emotional responses following injury given the lack of a population specific measure of emotional responses in the previous research. In addition, as noted throughout this thesis, Wiese-Bjornstal et al (1998) proposed a number of personal and situational factors thought to influence the emotional responses following injury. Whilst Wadey et al's (2012a and b) studies enhance the knowledge in relation to the role of hardiness it could be considered short sighted to adopt hardiness as a measure to assess the predictive validity of the ERRUIS without taking into account the many other factors thought to influence both the cognitive appraisal of the injury and the responses.

In addition, one of the key strengths of the development of the scale may also be seen as a limitation of the study. In response to the lack of research examining the emotional responses in recreational level athletes (Levy et al, 2009) and also research exploring the emotional responses of a specific type of sport (Johnson, 2007), this measure of emotional response was developed and validated using injured recreational level rugby union players. Indeed, it is plausible to suggest that the largely homogenous sample in relation to sports participation added to the content and construct validity of the scale. Nevertheless, the reliability and validity of the scale has not been tested using a wider population of injured athletes. Therefore, the scale should only be considered applicable to injured recreational level rugby union players. As a consequence, this is a narrow range of injured athletes for which the scale can be applied to. Future research would need to assess the scale's applicability, reliability and validity in relation to a wider range of injured athletes.

In relation to stage 2 of this study, the findings of the moderated hierarchical regression analysis demonstrated the impact that perceived injury severity and social support has on the emotional responses following injury in recreational level rugby union players. One of the principal aims of this second stage was to measure the convergent validity of the

ERRUIS. Through providing empirical support for the integrated model of sport injury response, specifically in relation to factors thought to influence the emotional responses following injury, it was felt that stage 2 of this study did demonstrate the convergent validity of the scale.

Nevertheless a number of limitations were reported with this study. Specifically, the researcher elected to measure the aggregate score of the SSIA to form a measure of 'Global' social support. However, in relation to sports injury, social support is considered a multidimensional concept with different types of social support thought to influence the emotional response in different ways (Arvinen-Barrow and Pack, 2013). Specifically, Mitchell et al (2005) in the development of the SSIA proposed that there are four main types of social support that are applicable to sports injury. Namely: Tangible Support, Informational Support, Emotional Support and Esteem Support. Whilst researchers are not universal in the agreement on the labeling of the types of social support, Arvinen-Barrow and Pack (2013) stated that these four types have had the most research in relation to the sports injury response. However, Rees et al (2010) suggested that in relation to the psychological responses following injury, injured athletes may not distinguish between the different types of social support in a quantitative setting. Specifically, they reported no differential relationships between the four subscales of social support incorporated in the SSIA. They concluded that a combined, aggregate, social support score measuring 'global' social support captured the findings equally well. Additionally, in relation to the SSIA, Mitchell et al (2013) reported Cronbach alpha coefficients of less than .70 for two of four subscales ('Emotional Support' and 'Tangible Support'), this would suggest issues of internal reliability when considering each subscale separately. In addition, as Rees et al (2010) study included a stage that specifically explored the relationship between stressors, social support and injury response in low level athletes, it was felt more appropriate to draw a greater comparison with this study, particularly as the principle aim of this second stage was to assess the convergent validity of the ERRUIS.

However, contrary to Rees et al's (2010) assertions, Mitchell et al (2013) reported differences in the relationship between the specific types of social support and the psychological responses following injury. Specifically, they reported no stress-buffering effect for perceived tangible support and the psychological responses following injury, whereas they did report a stress-buffering effect for perceived emotional and esteem support in relation to the psychological responses following injury. Therefore, future studies should explore the impact of different types of social support on the emotional responses following injury.

As noted, social support is considered a multidimensional concept and its relationship on the emotional and behavioural response following injury is considered complex. In addition to the type of social support, another factor thought to influence the social support and emotional response following injury relationship is the quality of social support (Arvinen-Barrow and Pack, 2013). A recent qualitative study concluded that, particularly in relation to informational support, the passion and enthusiasm that rehabilitation practitioners deliver their information was a critical aspect as to the emotional well-being of the injured athletes (Abgarov et al, 2012). Udry et al (1997a and b) reported that poor quality of social support can have a negative impact on both the emotional response and rehabilitation adherence levels. Similarly, Green and Weinberg's (2001) study of recreational athletes also reported a relationship between the quality of social support provision and mood disturbance levels, with those injured athletes' with increased levels of social support satisfaction correlating with lower levels of negative mood disturbances during the injury process. Whilst this present study explored perceived social support it did not examine how the injured athletes perceived the quality of the social support that they were receiving. It is plausible to suggest that the quality of social support provision may have a stress-buffering effect on emotional responses following injury. Further research is needed to explore not just the relationship between specific types of social support and the emotional responses following injury, but also the perception of the quality of social support on the emotional responses in injured athletes.

In addition, there are still many aspects of the integrated model of injury response that need further exploration. For example, the hypothesised relationship between the emotional response following injury and the behavioural response, such as rehabilitation adherence, could have a major impact for researchers, applied sport psychologists, sports coaches and rehabilitation professionals. Qualitative studies, including the findings reported in chapter 3 and 4 of this thesis, have provided some support that the emotional responses following injury can influence rehabilitation adherence, although a lack of a population specific measure of emotional response following injury has prevented this aspect of the Wiese-Bjornstal et al (1998) model to be comprehensively examined. Whilst this study did not examine this relationship, the content, construct and convergent validity of the ERRUIS suggests that it may soon be possible to quantitatively research this aspect of the model. Future studies exploring the relationship between the emotional responses following injury and rehabilitation adherence levels could have major consequences into the provision provided by rehabilitation professionals and sports coaches for injured athletes and provide researchers and applied sport psychologists with a greater understanding on how intervention strategies designed at enhancing positive emotional responses may impact on rehabilitation adherence.

6.7 Chapter Summary and Conclusion.

Despite these limitations, the findings of the study does provide support for the Wiese-Bjornstal et al (1998) model by highlighting the impact that both social support and perceived injury severity has on the emotional response following injury. In addition, these findings have important implications for researchers, applied sport psychologists, sport coaches and rehabilitation professionals. The direction of the main effect impact of social support on the emotional responses in injured recreational level rugby union players suggested that attempts to increase perceptions of, and provide social support should be encouraged following injury irrespective of both the sports participation level and also the level of stress experienced by the injured athlete. Norris and Kaniasty (1996) suggested that provision of support may increase the perceptions of social support both in relation to

the social support networks available to them and the perceived quality of support. Therefore, athletes should be encouraged in utilising the available networks when injured. In addition, Richman, Hardy, Rosenfeld and Callanan (1989) encouraged coaches to employ an open door policy for injured athletes; this again would increase the athletes' perception of the social support networks that are available to them. Similarly, Bianco and Eklund (2001) reported that coaches, family, friends and rehabilitation professionals need to have a strong awareness and education in relation to the requirements of the injured athlete. Whilst such conclusions have generally only taken into account the needs of elite level athletes, the findings of this present study highlight that social support has a major impact on recreational level athletes' emotional responses and therefore such strategies should be considered irrespective of the participation level.

Additionally, the research provided support for existing studies (e.g. Smith et al, 1990b; Smith et al, 1993; Mainwairing et al, 2010; Malinauskas, 2010) that have highlighted the impact that perceived injury severity can have on the emotional response following injury. As a consequence this provides further support for the Wiese-Bjornstal et al (1998) model as this postulated that perceived injury severity was a personal factor that could impact on the individual, subjective, appraisal of the injury and consequently their emotional response. Whilst limitations were reported in making assumptions that injured athletes with high perceived injury severity were more likely to be reporting higher levels of stress, the inconsistencies in existing studies exploring the stress-buffering effects of social support on the injury response led to the researcher questioning how the stress-buffering qualities of social support should be interpreted. Future research may consider using mediation regression analysis as a mechanism as this technique would appear to be more applicable to Wheaton's (1985) proposed impact of social support in relation to the stress response.

The findings of both stage 1 and stage 2 of this study has provided further support for the content, construct and convergent validity of the scale. The sequential model testing approach in stage 1 of this study demonstrated a good fit for the hypothesised 52 item, 7

factor measure. High standardised factor loading scores and internal reliability coefficients suggest strong construct validity for the scale, which had previously undergone systematic content validity testing and exploratory factor analysis. Stage 2 of this study demonstrated good convergent validity of scale as a relationship was found between both social support and perceived injury severity in the hypothesised direction. Whilst further studies are needed to explore the predictive validity of the scale and also the validity and reliability of the scale in relation to injured athletes other than recreational level rugby union players, the confirmatory factor analysis has assisted in establishing the validity of a population specific measure of emotional responses following injury. This is considered a much needed tool to further the knowledge of the emotional responses following injury (Evans et al, 2006). It is plausible, in future, to use this tool to explore the relationship between the emotional and behavioural responses following injury. This could have major consequences in the provision provided by sports coaches, sports psychologists and rehabilitation professionals to injured athletes. In addition, researchers could use this scale to study the impact of intervention strategies on both the emotional and behavioural response following injury.

Chapter 7

Contextualising the research, general discussion and conclusion, implications and future research directions.

7.1 Summary of Research programme.

The overarching aim of this thesis was to expand the knowledge base about emotional responses following injury in recreational level rugby union players, with the aim of developing and providing preliminary validation of a frequency measure of emotional responses following injury. Wiese-Bjornstal et al's (1998) integrated model of injury response proposed that the emotional responses following injury have a prevalent role in influencing both the cognitive appraisal of the injury and also the behavioural response, such as rehabilitation adherence. However, empirical research testing the Wiese-Bjornstal et al (1998 model), has been extremely limited (Walker and Heaney, 2013). Evans et al (2006; 2008) suggested that the lack of empirical research exploring the emotional responses following injury is, in part, due to the lack of a population specific measure. Indeed, the limited quantitative studies in this field have relied heavily on non-population specific measures, such as the Profile of Mood States (POMS: McNair et al, 1971), which may lack content validity, particularly as existing qualitative studies on elite athletes have suggested that the emotional responses following injury is more complex and widespread than those moods reported in POMS. In addition, prior to this thesis, research had yet to examine specifically the emotional responses following injury in recreational level athletes despite assertions that sports participation level could impact on the integrated response, both emotional and behavioural, following injury (Wiese-Bjornstal et al, 1998). This omission is surprising considering that the majority of people who participate in sport will not be of elite level; therefore it could be assumed that the majority of sporting injury occurrence will involve recreational level athletes. Consistent with the central tenets of the

Weise-Bjornstal et al (1998) integrated model of injury response, this programme of research aimed to explore qualitatively the emotional responses following injury in recreational level rugby union players and factors thought to influence the emotional response (study 1); physiotherapists' perceptions of the emotional responses experienced by recreational level rugby union players following injury, their perceptions on the relationship between the emotional response and behavioural responses and the role of the physiotherapist in relation to the injury response (study2); the development and initial validation of the Emotional Responses to Rugby Union Injury Scale (ERRUIS, study 3); and confirmatory factor analysis of the ERRUIS, examining the convergent validity of the scale through exploring the main effects of perceived injury severity and also the main and buffering effects of social support on the emotional responses following injury in recreational level rugby union players (study 4).

The following subsection presents an overview of the four studies that provides the main element of this thesis.

Study 1: Exploring the emotional responses following severe injury in Recreational Rugby Union Players: A longitudinal perspective. Essential to the overaching aims of this programme of research noted in section 1.6, the purpose of this study was to explore the range of emotional responses experienced by recreational level rugby union players, factors that influenced the emotional response and how the emotional response might influence both the cognitive appraisal of the injury and the behavioural response. Using Lazarus' CMRT as a conceptual framework, this study aimed to examine the emotional responses following injury in relation to the Wiese-Bjornstal et al (1998) model. Following a pilot study, semi-structured interviews using 6 injured recreational rugby union players were conducted in a prospective, longitudinal design. Based on the recommendations of Tracey (2003), the interviews took place at three stages of their injury journey, at the earliest possible convenience after the injury, mid phase of the journey and approaching a return to sport. This was the first prospective, longitudinal study to use three specific points in the injury journey in relation to data collection. Interpretative

Phenomenological Analysis (IPA, Smith, 1996) was the approach used during the study and analysis of the interviewed athletes followed the structure that was proposed by Smith and Osborn (2008). Analysis of the interviews suggested three superordinate themes, each of which contained a number of sub themes. In relation to the emotional responses throughout the injury period (first superordinate theme), the most frequently experienced and discussed were fear, anxiety, confusion, feeling low, joy / happiness / euphoria, anger and boredom. This provided support but also expanded on the emotional responses postulated by Wiese-Bjornstal et al (1998). The participants also discussed a number of factors that influenced the emotional response (the second superordinate theme) including: perceptions of pain, physical symptoms, perceived injury severity, history of injuries, social support, treatment efficacy, work, athletic identity, age and coping. Similarly, this also supported and expanded on Wiese-Bjornstal et al's (1998) postulated personal and situational factors thought to influence the injury response. In relation to the impact of the emotional responses on the behavioural response (the third superordinate theme) the emotional response was said to impact on the injured athletes' behaviour, particularly regarding seeking rehabilitation and rehabilitation adherence, seeking social support and difficulties related to home life. In addition, the narratives from the injured athletes suggested that the appraisal of the emotional responses could also impact on their behavioural response. In conclusion, the findings suggested that sports injury is a significant source of stress for recreational level athletes with widespread emotions being experienced across the rehabilitation journey. The study supported and expanded on the Wiese-Bjornstal model, highlighting that the emotional response is transient in nature influenced by the individual, subjective, appraisal of the situation which can adapt throughout the injury period.

Study 2: NHS chartered physiotherapists' perceptions of the emotional responses following injury in recreational rugby union players: A focus group study. This study was also essential to the overarching aims noted in section 1.6 as its aim was to provide a detailed understanding of physiotherapists' perceptions of the emotional responses that injured recreational level rugby union players' experience. In addition, physiotherapists'

interpretations of what might influence the emotional response, their views on the relationship between the emotional and behavioural response and the role of the physiotherapist in relation to the emotional response was also discussed. Two semi-structured focus groups were carried out with nine NHS chartered physiotherapists involved in both focus groups. A phenomenologically-informed thematic analysis was employed to interpret the data in both focus groups. Across the two focus group sessions, four superordinate themes emerged from the data, each of which contained a number of sub themes. Specifically, in relation to the emotional responses experienced (first superordinate theme), in addition to the emotions discussed in study 1, the physiotherapists noted that injured recreational level rugby union players can also experience increased levels of apathy as a consequence of injury. The second superordinate theme, individual differences in emotional response, reported potential gender differences in the emotional response to injury in recreational rugby union players. Additionally, previous treatment, perceived injury severity and social support networks all had a role in influencing the emotional response following injury. The physiotherapists also discussed a number of strategies that they use in relation to influencing the emotional and behavioural response (the third superordinate theme), they extensively adopted goal setting strategies and strategies at enhancing social support. Less frequently they used other strategies such as positive self-talk, imagery and relaxation techniques. They also discussed the training that they had in implementing these strategies (the fourth superordinate theme). They were satisfied with the training they had received in relation to goal setting and social support training. Training in relation to relaxation techniques was less frequent, although they did speak about the opportunities they had for undertaking such training. This study increased the knowledge base derived from study 1 in relation to the emotional responses following injury in recreational level rugby union players. Study 2, highlighted emotional responses and factors that influence the emotional responses that were not reported in study 1. These had also not been previously postulated as part of the integrated model of injury response.

Study 3: Development and Initial Validation of the Emotional Responses to Rugby Union Injury Scale. Following on from the two previous qualitative studies, the purpose of this study was to develop and provide initial validation of a population specific measure of emotional responses following injury. This was considered an important piece of future research considerations as noted in a recent review of existing literature (Evans et al, 2006) and was essential in relation to the overarching aims of the thesis noted in section 1.6 as not only did this study enhance the existing knowledge on the emotional responses following injury, but provided initial validation for the ERRUIS. Extensive planning work was conducted, based on a framework of best practice in scale development from several authors, including Rattray and Jones (2007). This included re-examination of the data from both study 1 and study 2 and an extensive literature search in order to generate items that may be applicable to the scale. Physiotherapists were used as subject matter experts and their expertise used to guide the content validity of the items. Following this stage, a total of 56 emotional statements were included on the original measure, which examined the frequency of these statements on a five point scale. Pilot work on 10 injured recreational level rugby union players further established the content validity of these items. Following the pilot work, 583 currently injured recreational rugby union players completed the scale and exploratory factor analysis was subsequently conducted. Using the principal axis factoring method of extraction and promax rotational method, the final analysis structure revealed a 52 item, seven factor structure. Specifically, the factors were labelled 'Anger/Frustration', 'Low/Depressive feelings', 'Positive emotions', 'Anxiety', 'Fear',' Boredom/Apathy' and 'Confusion'. These emotions labels were documented in the previous two studies therefore applicable to the specific population in which the scale was developed. Deeper analysis of the items suggested that there was clarity between the items and the overriding factor label was also applicable to existing studies. Internal reliability for each subscale was above the.7 recommended by Nunnally (1978). Additionally, inter-factor correlations were consistent with the existing sports injury response research. Whilst further validation work was needed on the measure, the development of a scale was considered a necessity in furthering the understanding of the emotional response following injury, particularly the relationship between the emotional

and behavioural response. Therefore, in relation to enhancing rehabilitation adherence, such a scale could prove to be of critical importance.

Study 4: Confirmatory Factor Analysis of the ERRUIS and examination of perceived injury severity, social support and test of the buffering hypothesis. Effects on the emotional responses following injury in recreational level rugby union players. The purpose of this study was to further examine the validity of the ERRUIS and was conducted in two stages. Firstly, a confirmatory factor analysis was carried out to provide further analysis of its construct validity. The second stage tested the convergent validity scale and also expanded the knowledge in the area through assessing the relationship between perceived injury severity, social support and the emotional response following injury. In relation to the first stage, 402 injured recreational level rugby union players completed the hypothesised 52 item, 7 factor ERRUIS. As recommended in scale development research, a sequential model test approach was conducted with maximum likelihood method of estimation. Whilst some caution must be taken in light of the multivariate kurtosis reported, the single factor analysis, pairwise analysis and whole model suggested a good fit for the hypothesised model for a number of the assessments of model fit adopted. Additionally, internal reliability for each subscale was above the .7 criteria recommended by Nunnally (1978). Therefore following stage one of this study, the hypothesised 52 item, 7 factor structure derived from study 3 was retained with no modifications.

In relation to the second stage, in line with both the stress-buffering hypothesis and the Wiese-Bjornstal et al (1998) model, the influence of perceived injury severity and social support on the emotional responses following injury was assessed. In addition to completing the ERRUIS, the 402 injured recreational rugby union players completed the perceived injury severity component of the Sports Injury Rehabilitation Beliefs Survey (SIRBS, Taylor and May, 1996) and the Social Support Inventory for Injured Athletes (SSIA; Mitchell et al, 2005). In line with the research hypothesis, moderated hierarchical regression analysis revealed a main effect of perceived injury severity in relation to the

frequency of several emotions incorporated in the ERRUIS. Specifically, injured recreational level athletes with high perceived injury severity were more likely to experience a higher frequency of 'Anxiety', 'Low / Depressive feelings', 'Confusion', 'Fear' and a lower frequency of 'Positive Emotions'. Similarly, a main effect of social support in relation to the emotions included into the ERRUIS was also reported in the hypothesised direction. Specifically, injured recreational level athletes with high social support were more likely to experience lower frequencies of 'Anger / Frustration', 'Anxiety', 'Low / Depressive feelings', 'Apathy / Boredom', 'Confusion', 'Fear' and a higher frequency of 'Positive Emotions'. However, the moderated hierarchical analysis did not provide support for the buffering hypothesis as no significant interaction was reported between social support, perceived injury severity and the emotional responses following injury. Nevertheless, the main effect findings of social support and perceived injury severity demonstrated convergent validity of the ERRUIS as the impact of social support and perceived injury severity on the emotional response has been suggested previously. In relation to the stress-buffering hypothesis, whilst a non-significant interaction was not hypothesised, it is worth reporting the Mitchell et al (2013) stated that finding empirical support for the stress-buffering hypothesis is not uncommon in the sports literature. Whilst this is discussed in more length in both the relevant empirical chapter (chapter 6) and also in section 7.2, researchers may need to re-consider the applicability of the stress-buffering effect of social support relating to the sports injury response. This study further enhanced the knowledge base of the emotional responses following injury in recreational level athletes through examining its relationship with factors thought to influence the response. This study also provided further validation for the application of the ERRUIS as a measure of the emotional responses following injury, consequently this study was essential in relation to the overarching aim of this programme of research outlined in section 1.6.

7.2 Theoretical, conceptual and measurement contributions (including the changes to the Wiese-Bjornstal model).

Whilst the end outcome of the thesis was the ERRUIS, all four studies explored the emotional responses following injury, factors that may influence the cognitive appraisal of the injury, the relationship between the appraisal and the emotional response and the interaction between the cognitive appraisal and the emotional and behavioural responses. The findings derived from the four studies of the programme of research contribute to the sports injury literature in a variety of ways. Originally derived from mainstream psychology, Lazarus' CMRT (1991a,b,c; 1999; 2000a,b) has more recently been applied to sports performance and it has been recommended that this theory should be used as a guiding framework for future research investigating the emotional responses in sports (Campo et al, 2012). However in relation to the sports injury response, whilst it is apparent that the Wiese-Bjornstal et al (1998) appraisal based model is heavily influenced by the work of Lazarus, studies using the CMRT as a theoretical framework is limited.

The Wiese-Bjornstal et al (1998) model has guided an inspired research in this area since its inception; however in a number of ways the empirical research assessing the applicability of the model has been limited (Walker, Thatcher and Lavallee, 2007). Specifically, there has been very little research exploring the relationship between the emotional and behavioural responses. Additionally, due to a lack of a population specific measure the previous quantitative research examining the factors thought to influence the emotional response should be viewed with some caution (Evans et al, 2006). Furthermore, there has been no previous research examining the emotional responses in recreational level athletes of a certain sporting type (Johnson, 2007; Levy et al, 2009).

This section, which is divided into three subsections, provides a summary of the theoretical, conceptual and measurement contributions that are stemming from, or related to, the four studies that comprise this programme of research. Whilst these have been

discussed in the relevant empirical chapters, these subsections highlight how this programme of research has contributed to and expanded on the existing knowledge and theoretical underpinnings of this field.

7.2.1. How does this programme of study challenge and extend existing models of injury response.

The findings of the first two quantitative studies, provided some support for the applicability of Lazarus's conceptual definition of emotion which formed an integral aspect of his CMRT (1991a,b,c; 2000a,b). Specifically, study 1 highlighted the role of appraisal on the experience of emotions following injury in recreational athletes. The analysis of the data suggested that, in line with the CMRT framework, injury is a source of stress for the recreational level athlete and the primary and secondary appraisals can lead to a number of true emotional responses which can have an impact on their behavioural responses. In accordance with Lazarus' work, the analysis of the first two studies suggested that injured rugby union players can experience a widespread number of emotions throughout the recovery journey. These included fear, anxiety, positive emotions, and anger. In addition, whilst Lazarus did not classify confusion, boredom, apathy and feeling low as true emotions a number of authors have considered these as emotional feelings and were noted in the analysis of the first two studies. Consequently, these emotional states were included as part of the ERRUIS. Therefore, whilst these two qualitative studies provide support for the CMRT in relation to the role of appraisal in the emotional response and the relationship between emotions and behaviour (see section 7.2.2), futher consideration and research is needed in relation to providing a definition of emotion and what feelings can be considered a true emotion. In relation to the experience of positive emotions, this was not considered in early studies exploring the injury response and not part of early theoretical frameworks of the injury response, such as those based on Kubler-Ross (1969) grief model.

The findings of the first two quantitative studies both supported and extended the Wiese-Bjornstal et al (1998) model. Specifically, whilst supporting frequent emotional responses highlighted by the model (see figure 2.1), the first two studies extended this by also noting that 'anxiety', 'apathy' and 'confusion' are frequently experienced by recreational level rugby union players. Both qualitative studies highlighted that the emotional response was influenced by the injured athletes' cognitive appraisal of the injury, which supported a central aspect of the Wiese-Bjornstal et al (1998) model. Another important aspect of the Wiese-Bjornstal et al (1998) model is the concept of change and the transient nature of the emotional responses. A large number of previous studies have not accounted for this concept as they have utilised a research design that only measures the injury response at one specific time (e.g. Granito, 2001, 2002; Gould et al, 1997b, Udry et al, 1997a; Hurley, Moran and Geurin, 2007; Daly et al 1995). Consistent with previous studies that have used such strategies on non-recreational level athletes (e.g. Tracey, 2003; Bianco et al, 1999; Bianco, 2001; Carson and Polman, 2008; Podlog and Ekulund, 2006; Udry, 1997; Evans et al, 2000), study 1 examined and found support for transient changes in the emotional response. Specifically, the findings did not conclude that the emotional responses as a consequence of injury are predictable and follow a sequential pattern, but suggested that the emotional response is more complex and influenced by the cognitive appraisal of the situation. As a consequence, this study did not provide support for older theories of the emotional response following injury, specifically models based around the Kubler-Ross (1969) grief model.

In accordance to the Wiese-Bjornstal et al (1998) model, the first two studies suggested that a number of personal and situational factors can influence the individual's subjective appraisal of the injury and consequently the emotional response. However, the impact of the injury in relation to work was a factor that has not been considered previously and was not postulated by the Wiese-Bjornstal et al (1998) model. One explanation for the lack of previous consideration for this factor is that the majority of previous studies, both quantitative and qualitative, have only considered elite level athletes experiences. Study 1

suggested that the impact of the injury in relation to work had a major impact on both the emotional and behavioural response following injury and therefore may warrant further research.

7.2.2 Are negative emotional responses always detrimental to the behavioural response?

The major theoretical contribution in relation to expanding the Wiese-Bjornstal et al (1998) model derived from these first two studies concerned the relationship between the emotional response and behavioural response. Evans et al (2006) highlighted the need for further research in this area as empirically it has been unclear if negative emotional responses are always detrimental to the behavioural response. Research in health psychology examining the emotional responses following illness has suggested that negative emotions invariably lead to detrimental behavioural responses, particularly in relation to rehabilitation adherence (Kronish et al, 2006; Kalsekar et al, 2006; Sirey et al, 2007; DiMatteo et al, 2000; Luyester et al, 2009; Mohr et al, 1997). Indeed, early studies relating to sports injury suggested a similar response (Evans et al, 2000; Gould et al, 1997b). However, both the interviews with the injured recreational level rugby union players and focus groups with the physiotherapists suggested that this is not necessarily the case.

In line with Lazarus' CMRT, the findings from these studies suggest that the appraisal of the emotional responses can influence the behavioural response and there are a number of factors that might influence this appraisal process. For example, Lazarus' (2000a) suggested the one athlete's appraisal and subsequent behavioural response after experiencing the emotion of anger might differ from another athlete experiencing the same emotion. Similarly, in study 1 some of the athletes reported how negative emotions states,

such as anxiety, were consciously appraised and resulted in positive behavioural responses, particularly in relation to seeking medical attention and rehabilitation adherence. With other participants, the appraisal of anxiety did result in detrimental behavioural responses. The physiotherapists in study 2 also highlighted the role of appraisal of the emotions in relation to the influencing the behavioural response. As stated, whilst this is an essential aspect of the CMRT, this has not been considered in the sports injury literature and is not part of the Wiese-Bjornstal et al (1998) model. Indeed, it is still regularly postulated that negative emotions will invariable lead to detrimental behavioural responses (Evans et al, 2006). Wadey et al (2012b) suggested that futher research was needed on the relationship between the emotional and behavioural response following injury and these qualitative studies have gone some way in addressing this gap in the literature. A full graphical representation of the proposed expansion of the integrated model of injury following the findings outlined in this thesis is detailed in Figure 7.1. This figure includes sections that have been expanded as a consequence of this programme of research being the first to explore the applicability of the model in relation to recreational level athletes. In addition, a new section highlighting the appraisal of the emotions and its influence on the behavioural response is included. The researcher is mindful that further research is needed to substantiate these proposed extensions.

7.2.3 Contribution of the quantitative aspects of this programme of research.

The development of the ERRUIS can lead to future research that will make further contributions to the knowledge and understanding of this complex area. This has major practical implications for a wide range of services and financial implications (Bassett, 2003; Hackfort and Kleinert, 2007). Evans et al (2006) recommended that researchers should develop a population specific measure and this programme of research was considered as a response to those future research recommendations. Studies 3 and 4 reported the development and validation of the ERRUIS and the interpretations of the EFA and CFA suggested a scale with strong content, construct and convergent validity with high levels of internal reliability. Developing such a scale has been considered a challenge

given the transient nature of the emotional responses following injury (Evans et al, 2006) and consequently it is perhaps unsurprising that such a scale has not been developed previously. Whilst the qualitative studies expanded the knowledge base in this topic as individual studies, collectively they also were critical in the development of the ERRUIS. Comprehensive and systematic planning was essential in developing the ERRUIS, including effective collaborative work during the item generation stage and the resulting 52 item, 7 factor structure appears to cover the widespread emotional responses that recreational level rugby union players can experience.

Whilst in many ways the value of such a tool will be largely dependent on studies beyond this programme of research (see section 7.6), the two quantitative studies involving the ERRUIS highlighted its potential in making a significant impact in this area of research. For example, during the initial validation of the ERRUIS (study 3), the inter-factor correlations for the ERRUIS provided support for existing qualitative studies which have suggested that, although conceptually different, there are significant correlations in the frequency of experiences for a number of emotions following injury (e.g. Tracey, 2003; Bianco et al, 1999; Bianco, 2001). Specifically, injured athletes who experienced a high frequency of a negative emotion, such as anger, were also more likely to experience a high frequency of other negative emotions. Furthermore, injured athletes who experienced a high frequency of positive emotions were less likely to experience high frequencies of negative emotions. This is the first time such an observation was reported in recreational level athletes using a population specific measure.

In addition, study 4 provided the first quantitative examination of the Wiese-Bjornstal et al (1998) model specifically concerning the relationship between perceived injury severity, social support, and the emotional responses following injury using population specific measures. As hypothesised, main effect relationships were found for both perceived injury severity and social support in relation to the frequency of specific emotional responses experienced as a consequence of injury. This not only provided convergent validity for the ERRUIS but also further empirical support for the Wiese-Bjornstal et al model. In

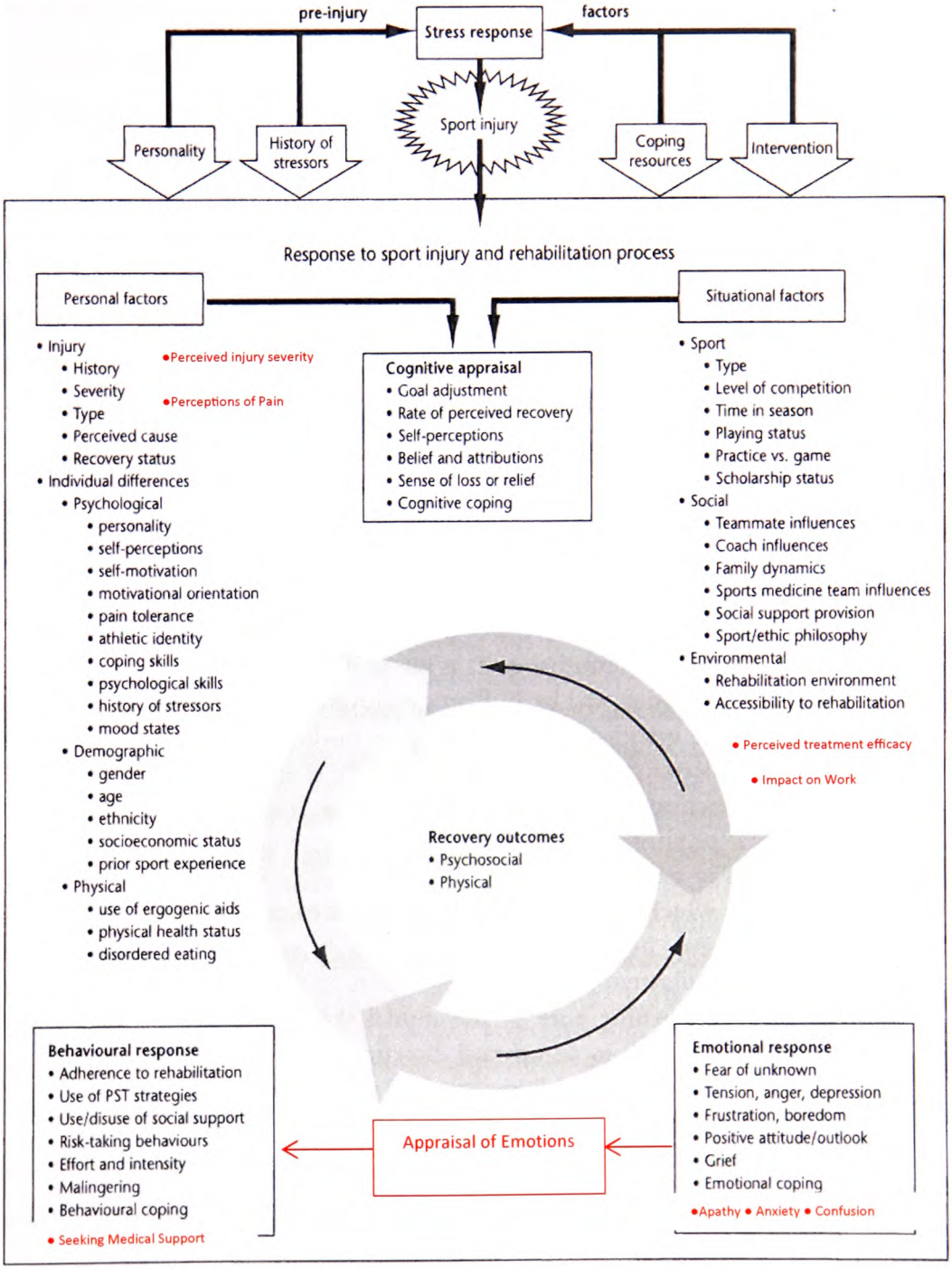
addition, this study was also the first to examine the stress buffering hypothesis (Cohen and Wills, 1985) of social support in relation to the emotional responses following sports injury. Specifically, this study explored if high levels of social support could moderate the detrimental impact associated with high perceived injury severity on the emotional responses following injury. Whilst the analysis did not provide support for the stress-buffering hypothesis, it was important to note the number of studies that have also been unable to provide empirical support for this hypothesis (Mitchell et al, 2013). The qualitative interviews appeared to suggest that social support can mediate the negative effect of stress on the injury response. Consequently, this could be considered more in line with the interpretations of the stress-buffering hypothesis from other fields, which have suggested a mediating as opposed to moderating role of social support on the responses to stress (e.g. Hobfoll and Walfisch, 1984; Grassi et al, 1987; Brissette et al, 2002; Aneshensel, 1992). Indeed, the significant negative correlation between perceived injury severity (stressor) and social support would suggest a relationship between these two variables that is not indicative of the interpretation of the stress-buffering hypothesis in a sports injury response setting as stated by Rees (2007). Further research is needed to explore these relationships quantitatively; this is now a viable study in the future due to the development of the ERRUIS.

Whilst the proposed stress-buffering effects of social support on the responses to stress was not supported in study 4, the study also provided further validation of the SSIA (Mitchell et al, 2005) as a population specific measure of multidimensional social support. Indeed, as a main effect relationship between social support and the emotional responses following injury were supported in the hypothesised direction, study 4 demonstrated the convergent and predictive validity of the SSIA. In addition, assessment of the internal reliability of the scale as a global measure of social support was above the .7 recommended by Nunnally (1978). Whilst further testing is required in relation to the specific subscales of the SSIA, it would be recommended that future quantitative research exploring social support in relation to sports injury should use the SSIA as a population specific measure with predictive validity and appropriate levels of internal reliability.

Furthermore, this study was the first to explore quantitatively the impact of perceived injury severity on the emotional responses following injury. Research in non-sports injury literature have reported that perceived injury severity is a more accurate predictor of psychological well-being than more objective measures of injury severity (Brasel et al, 2010) and, as a consequence, this is another aspect that has required further research in relation to sports injury response (Evans et al, 2006). Using the perceived injury severity component of the SIRBS (Taylor and May, 1996), the findings reported a main effect of perceived injury severity on the emotional responses following injury in the hypothesised direction. Despite the perceived injury subscale displaying less than satisfactory psychometric properties previously (e.g. Taylor and May, 1993, Taylor and May, 1996), the internal reliability of the subscale in relation to study 4 was above the .7 recommended by Nunnally (1978). In addition, as the results of the analysis were in the hypothesised direction this would suggest good predictive validity properties of the scale. Given the lack of previous research regarding perceived injury severity on the sports injury response, further research is recommended to expand the understanding and knowledge on this relationship, particularly exploring the relationship between perceived injury severity and stress levels. Following this programme of research it would be recommended that consideration is given to adopting the perceived injury severity subscale of the SIRBS as a reliable, population specific measure of perceived injury severity that is appropriate for future research.

Figure 7.1 *Visual display of proposed amendment to the integrated model of injury response (Wiese-Bjornstal et al, 1998) following this programme of research (additions in red).*

Source:Adapted from Wiese-Bjornstal et al (1998); reprinted with permission from Taylor and Francis / Routledge



PST = psychological skills training

7.3 Recommendations for Physiotherapists.

Whilst the four studies make an important theoretical contribution into the emotional responses following injury experienced by recreational level athletes, its impact on the behavioural response and factors that influence the emotional response, the findings from this research programme also identified areas that are of importance to sports injury rehabilitation professionals, such as physiotherapists in an applied setting. Specifically, studies one and two highlighted the important role that the physiotherapist has in the injured athletes' emotional response and their mediating influence on the cognitive appraisal of the injury and also the behavioural responses. This appeared especially the case for recreational level athletes who may not have experienced sports injury as frequently and, consequently, may not be as familiar with interpreting the severity of the injury and the rehabilitation experience.

Contrary to previous studies, such as Arvinen-Barrow et al (2010), study 2 suggested that the physiotherapists appeared to have a good knowledge of the importance of the psychological aspects of injury in relation to rehabilitation adherence and outcome. In addition, they did report training in the use of psychological skills, particularly goal setting strategies and highlighted the importance of goal setting in relation to the appraisal of the injury and also as a motivational aspect. Interestingly, the physiotherapists also reflected on how goal setting can give recreational level athletes a realistic base of their current injury status which can occasionally lead to more negative emotional responses depending on the situation. The physiotherapists reported a good understanding of different types of goals and appeared very knowledgeable in the application of such goals. This is contrary to the conclusions made by Arvinen-Barrow et al (2010) who suggested the UK chartered physiotherapists have limited knowledge on the types of goals that could be applied to injured athletes. The physiotherapists in study 2 and the interviews of injured recreational level rugby union players in study 1 highlighted the value of the application of goals in relation to the appraisal of the injury, the emotional response and the behavioural response. Previous research has suggested that the application of goal setting can provide

injured athletes with a sense of purpose which can reduce negative, detrimental, emotional responses (Taylor and Taylor, 1997; Flint, 1998; Kolt, 2004). As the physiotherapists in this study spoke highly in relation to the training they had been given about the value and application of goal setting strategies, it is recommended that physiotherapists should seek out further training in relation to goal setting as previous studies (such as Arvinen-Barrow et al, 2010) have suggested that this is not always the case.

According to the physiotherapists' accounts in study 2, another beneficial aspect of the application of goals is the mutual dialogue which can increase the communication between injured athletes and rehabilitation professionals. The findings of study 1 and 2 highlighted the important role of physiotherapists in relation to being a source of social support and how this could impact on both the emotional and behavioural response following injury. In addition, study 4 demonstrated significant main effects of social support in influencing the frequency of emotional responses experienced. Specifically, injured athletes with high levels of social support were less likely to report a higher frequency of negative emotions and more likely to reports high frequencies of positive emotions. The injured athletes of study 1 discussed how a good rapport with the physiotherapist was a critical aspect in relation to their emotional well-being and adhering to the treatment. The physiotherapists in study 2 demonstrated a good knowledge of their role as part of a social support network and discussed the extensive training that they have undertaken. However, interviews of injured athletes suggested that support provided by physiotherapists or the primary health care in general was not consistent. Such opinions were also suggested by the physiotherapists in study 2, as they reported that many injured athletes have sought after their care having felt confused and low as a consequence of the previous support offered by other primary health caregivers. In study 2, the physiotherapists reported a good understanding that their role has expanded and they are now expected to provide emotional and esteem support in addition to informational support. They also appeared to be aware of the impact that the different types of support had on injured recreational level rugby union players' emotional and behavioural responses. However, they also reported that there are capacity issues and this could restrict them in relation to them meeting the

needs of the patient in terms of social support. Nevertheless, it was clear that communication and providing support was critical in the work of the physiotherapists in study 2 and when the support was considered good, it was a very important factor in the emotional well-being and behavioural responses of the injured athletes. Therefore, it is essential that all rehabilitation professionals value the importance of social support and engage in training in relation to the types of social support. The physiotherapists in study 2 appeared to have a good understanding regarding the importance of the emotional response in the injury outcome cycle. They appeared to have a good knowledge and were able to engage with the athletes' emotional responses, which they stated was well received in most cases. Having such knowledge may improve the physiotherapist / injured athlete relationship as the physiotherapist will be in a better position in understanding the individual needs of the injured athlete. Consequently, this may have a positive impact in relation to planning future treatment based on these needs.

7.4 Practical Implications.

In addition to the theoretical implications and recommendations for rehabilitation professionals, the programme of research contained a number of practical implications, which are particularly relevant to coaches, applied sport psychologists, medical professionals and the athletes themselves. As the aim of the programme of research was to explicitly explore the emotional responses following injury in recreational level athletes, it was apparent that injured recreational level athletes can make a significant personal investment in their sports participation and acquiring a sports injury is a significant source of stress for the athlete. As a consequence, injured recreational level athletes can experience a wide range of emotional responses which can not only impact on the behavioural response through an appraisal process, but can impact on longer term emotional well-being.

As a consequence, applied sport psychologists and sports coaches need to be aware of the impact that sports injury can have on the emotional well-being of recreational athletes. Furthermore, they need to be aware of the factors that can impact on the emotional responses following injury. It is important for coaches, sports psychologists and medical professionals to have an awareness that the factors that influence the appraisal of the injury may differ between elite and non-elite athletes. Specifically, study 1 and 2 suggested that coaches and practitioners should be mindful that the impact that the injury is having on the recreational athletes' employment can have a significant bearing on their emotional well-being. It may be especially important for those offering emotional support to consider the wider impact that the injury may be having on the lives of the athlete. Whilst study 1 highlighted that recreational athletes do make an investment to their sport, as with professional athletes, the injury could also impact on their livelihood. Therefore, it is important that coaches do consider this and not exclusively provide support to the injury in relation to the sports participation. Additionally, study 2 suggested that females especially have concerns about the consequences of the injury in relation to general health, it is important that support providers are aware of this when offering appropriate advice.

In addition, on the basis of this research it is recommended that coaches keep the injured athlete involved with the team as injured recreational level athletes with higher levels of social support were less likely to report negative emotional responses following injury, irrespective of the perceived injury severity (study 4). It would be recommended that with recreational level athletes coaches should offer an open door policy and are aware of the significant stress that can be experienced following injury. Furthermore, it would be recommended that support networks, whether those are professional or personal, encourage the injured recreational athlete to be more in control of the situation by placing the injury into perspective. Informational support from the physiotherapists appeared to be a method often used by injured recreational level athletes to establish a sense of control of the situation. The qualitative studies suggested that feeling of control was a critical factor in mediating the emotional responses following injury, with athletes feeling a lack of control more likely to report a greater frequency and intensity of negative emotions.

Therefore, it would be encouraged that support networks raise awareness and provide informational support, particularly at the early onset of injury.

Another key factor that impacted the emotional response was the perceived injury severity (study 4). It is important that practitioners are aware that perception of injury severity is a subjective interpretation and does not necessarily correspond to the practitioner's objective analysis of the injury. It has been suggested that recreational level athletes may not have as in-depth knowledge of sports injuries as elite level athletes and, consequently, may interpret the severity of injury based on pain levels, previous experiences and length of time they have experienced pain (study 1). It is essential that practitioners provide a clear understanding of the severity of the injury as this can provide the injured athlete with a sense of perspective and feeling of control. Study 1 and 2 suggested that there is less awareness of sports injuries in recreational level athletes and consequently these athletes may resort to using online resources or listen to the opinion of friends to try and form a diagnosis. This can occasionally lead to the athletes being misinformed about their injury which can increase a lack of control about the injury and impact on their emotional well-being. A peer mentoring system, which can raise awareness and provide a sense of perspective, has been shown to be an effective tool in relation to the emotional well-being in patients with brain injury (Hibbard et al, 2002) and spinal cord injury (Veith, Sherman, Pellino, and Yasui, 2006). Both of these studies suggested that peer mentoring can raise awareness, establish a sense of control and promote problem focused coping responses which can also have a positive impact in relation to the behavioural response. Such an intervention could be effective in sports injury, particularly in situations in which similar injuries have not been previously experienced by the athlete. Consequently, the introduction of a peer mentoring system in relation to sports injury may have a beneficial impact in relation to the emotional and behavioural responses following injury.

Physiotherapists suggested that effective goal setting strategies is a critical tool in relation to improving both the emotional well-being and the behavioural responses following injury (study 2). Consequently, practitioners are encouraged to engage with the injured

athletes to set goals throughout the rehabilitation journey. It is important that practitioners should adhere to the principles of goals setting (e.g. SMART goals) and both long term and short term goals should be considered and adopted. These implications have also been suggested empirically in relation to sports injury (e.g. Evans et al, 2000; Evans and Hardy, 2002a). Study 2 suggested that goal setting application is important in stimulating the communication between the injured athlete and the rehabilitation practitioner and can promote an increased awareness, feelings of control and sense of perspective relating to the athletes current injury status. In contrast to the conclusions of Arvinen-Barrow et al (2010), study 1 and 2 suggested that goal setting can impact on the athletes' cognitive appraisal of the injury and also buffer the negative emotions through increasing self-confidence levels. Furthermore and in line with Arvinen-Barrow et al (2010), effective goal setting strategies were sources of motivation which could directly impact on the rehabilitation adherence. The dialogue between the practitioner and injured athlete regarding the goal-setting feedback was also considered important, specifically it was considered essential that the injured athlete has a sense of empowerment in relation to the application of goals and the feedback mechanism provided by practitioners appeared to increase this (study 1). In study 2, the physiotherapists discussed self-management charts in relation to goal setting, this was considered effective as it encouraged that sense of empowerment and self-confidence as it would give a written record of the gains made. Fear of re-injury was a concern that some of the athletes in study 1 expressed towards the end of their rehabilitation; using a written record of progress as a result of goal setting charts may provide appropriate feedback in relation to the progress made and also the physical abilities of the injured body part. Wadey et al (2011) suggested that a strong sense of progress and confidence in the abilities since the injury are important in alleviating concerns when approaching a return to sport.

In relation to the theoretical contribution of the programme of research, contrary to early assumptions it is important the practitioners are aware that negative emotional responses do not necessarily equate to negative behavioural responses and injured recreational level athletes appraise the emotional responses which, in turn, can mediate the behavioural

response. It is important that support networks encourage the use of problem focused coping strategies, particularly in response to negative emotions. For example, it would be recommended that support networks encourage the injured athlete to seek medical support when feelings of confusion and fear are being experienced, particularly early in the injury period as the informational support provided by medical professionals would reduce these feelings. Study 1 also suggested that longer frequencies of certain emotional responses (e.g. frustration) could lead to other negative responses, such as depression, which could initiate maladaptive behaviours in relation to the recovery. Whilst it is important to be aware that some feelings of frustration are beyond the control of the injured athletes' support network, such as hospital waiting lists, the application of esteem support, providing appropriate feedback and encouraging empowerment could assist in the reduction of frustration. Furthermore, this programme of research demonstrated that other maladaptive emotional responses, including boredom and apathy, can be experienced by recreational level athletes as a consequence of injury. Whilst further research is needed concerning the impact of these emotions on the behavioural response, it is recommended that the rapport between practitioner and injured athlete, particularly regarding the goal setting dialogue, feedback and providing esteem support is important in reducing these responses (Study 1). Specifically, an enthusiastic physiotherapist who sets varied and challenging goals and provides encouragement and regular feedback via mutual dialogue is recommended to reduce boredom and apathy.

7.5 Research limitations

Despite the important theoretical and practical implications as a result of the programme of research leading to the development and initial validation of a scale that has been recommended by researchers as an important tool for future research, the programme of research was not without limitations. These are discussed within the relevant chapters of the empirical studies and are also stated here. Specifically, due to the methodological design of study 1, the researcher relied on participants' subjective and potentially biased view of their rehabilitation adherence and outcomes when interpreting the relationship

between the emotional and behavioural response following injury. In addition, the sample size of injured athletes used in study 1 was quite small and consequently, the findings could not be generalised to injured recreational level rugby union players as a whole. The participant recruitment strategy, which was essential for conducting a prospective, longitudinal study, may have resulted in only volunteers with an interest in discussing their injuries. As a consequence, this might not be representative of all recreational level rugby union players. Additionally, due to the design of the study, participants were contacted on several occasions to organise interviews at appropriate times in relation to their recovery. These may have led to experimenter effects and bias as the participants were reminded about their injury and recovery during these calls. In a study of a similar design, Tracey (2003) reported that the interviews and organisation may have inadvertently provided a source of emotional support and consequently influenced the injured athletes' emotional responses. Furthermore, as the study supported the notion of the transient dynamic nature of the emotional response following the injury, the choice of restricting the number of interviews to three data collection points could be considered another limitation to study 1. Additional interviews may have provided a more in depth understanding of the emotional responses following injury in recreational level rugby union players.

Study 2 expanded on study 1 in addressing the emotional responses following injury in recreational rugby union players using a very different research methodology. However, a number of limitations were also noted with this study. Specifically, due to practical issues a pilot study could not be arranged. Pilot studies are seen as beneficial in qualitative research in finalising the interview schedule and considering the phrasing of the questions to generate discussion (Smith and Osborn, 2008). Furthermore, focus group discussions involving a wider range of rehabilitation professionals, such as sports injury therapists, sports chiropractic and sports reflexologists may have yielded a more diverse discussion, which may have expanded the knowledge attained from this study. Another limitation of the study was that as one of the participants in the focus group was the line manager for some of the participants this could have compromised the contributions of all participants

and may have impacted on the dynamics of the groups. Whilst the researcher was the discussion facilitator and made all participants aware that everyone was an equal member of the focus group beforehand, it still was noted that the line manager's presence may have impacted on the discussions. A similar limitation noted in Arvinen-Barrow et al's (2010) study was also reported in study 2 of this programme of research. Specifically, due to the nature of how the sample was obtained, it might be implied that only physiotherapists with a strong interest in the emotional responses following injury were likely to volunteer to participate. As a consequence, it is possible that the sample was not representative of all NHS chartered physiotherapists. Indeed, many of the findings of this study contrasted Arvinen-Barrow et al's (2010) results and this could be a feasible explanation as to why this was the case.

In relation to study 3, many papers relating to best practice in planning and conducting scale development research were considered. However, as with the previous two studies a number of limitations were also reported. Specifically, the use of a self-report measure to note the amount of matches / training sessions missed through injury might not have been accurate. Whilst this did not form part of the analysis it was essential that the recreational level rugby union players were considered currently injured. In relation to this, whilst the NAIRS criteria was adopted to classify someone as being injured, consideration was not given to recreational rugby union players who, although able to train/play, might be carrying an injury. Through the process of the research, observational work by the researcher suggested that a large number of recreational level athletes still play despite suffering an injury. Furthermore, additional tests of construct validity, via measures of convergent validity with another measure were not conducted during study 3. Tests of convergent validity are considered an important stage in the scale development (Rattray and Jones, 2007). Linked to this, the EFA did not explore aspects thought to impact on the frequency of the emotional experiences following injury as postulated by Wiese-Bjornstal et al (1998). For example, exploring the impact of social support would have also tested the convergent validity of the ERRUIS. Additionally, whilst conducting an EFA is a common procedure in the initial validation of a scale, confirmatory factor analysis does

provide a theory driven approach to scale development and further evaluate the psychometric properties of the scale.

The two stage study 4 was conducted in part to address the limitations of study 3. Whilst study 4 did address many of the limitations and made a significant practical and theoretical contribution to the knowledge in the area, a number of additional limitations were noted. For example, whilst a central aim of the programme of research was to develop a population specific measure of the emotional responses following injury, the ERRUIS was developed and validated using recreational level rugby union players. Therefore, the reliability and validity of the scale in relation to a wider population, such as elite level athletes, has yet to be tested. Consequently, in its current form the ERRUIS should only be considered applicable to recreational level rugby union players. Furthermore, whilst the programme of research highlighted the importance of measuring the frequency of the emotional responses following injury, it has also been suggested that the intensity of the emotional responses can impact on both the appraisal of the injury and the behavioural responses (e.g. Udry et al, 2003; Evans et al, 2006). The ERRUIS in its current format does not measure the intensity of the emotional response following injury. In addition, study 4 did not demonstrate the predictive validity of the scale. Rattray and Jones (2007) recommended that tests of predictive validity are important in the validation of a psychometric measure. Whilst this is a time-consuming process and particularly complex given that the emotional responses is considered an outcome following injury, one recommended approach would be to examine pre-injury levels of the personality trait hardiness. This has been considered a relatively stable characteristic and recent studies have suggested that hardiness levels may have predictive qualities in relation to the injury response (Wadey et al, 2012 a and b).

In relation to the second stage, whilst this stage demonstrated the convergent validity of the scale, it might have been more appropriate to have considered the different facets of the social support as opposed to a global, aggregate measure recommended by Rees et al (2010). Whilst Rees et al (2010) suggested that, in relation to social support, injured

athletes might not distinguish between the different types in a quantitative study; Mitchell et al (2013) suggested that this was not the case and the different types of social support can impact on the injury response in different ways. Linked to this, greater consideration was needed in relation to the quality of social support. Qualitative studies have suggested that the quality of social support has a greater impact on the emotional response following injury than the type of social support (e.g. Green and Weinberg, 2001). However, this was not measured in this study due to a lack of a scale measuring social support quality. This is a plausible explanation for the non-significant findings in relation to the buffering effect of social support reported.

In addition to the preceding limitations, there are still a number of aspects of the Wiese-Bjornstal et al model that needs to be fully investigated. For example, with the development of a population specific measure of the emotional responses following injury it may be plausible to examine the relationship between the emotional and behavioural response and to seek additional clarity on factors that might influence this relationship. It was considered beyond the scope of the programme of research to explore such aspects in detail. However, this is possible in the future and such future directions are considered in section 7.6

7.5.1 Research strengths.

Despite the limitations reported in relation to the practical issues and methods used as part of this programme of research, it is important to note a number of key strengths in the four studies. The main strength is that each study, whilst all making important contributions to the development and initial validation of the ERRUIS, also made an important contribution to enhancing the knowledge of the emotional responses following injury in recreational rugby union players, thus all essential to the overarching aims of this thesis. The considerable thought and planning that was undertaken has led to the development of a systematic line of enquiry which considered and tested theoretical frameworks taking

into account existing limitations in the knowledge base and proposed future research recommendations from a number of literature reviews and research papers.

Whilst the exploraty nature of the first three studies especially was considered a challenge, such risks are considered important in the advancement of knowledge (Hardy et al, 1996). The emotional responses following injury have been long considered complex and transient in nature, therefore at the commencement of this programme of research there were some risks as to whether it would be feasible to capture the essence of the emotional responses in a scale. Despite the longstanding widespread criticisms of existing quantitative methods that have been adopted previously, this is the first time a population specific measure of the emotional response following injury has been developed and validated. Naturally, this was a risk that needed careful and in depth planning and piloting using a multiple stage approach. It was also felt that as the population selected were injured recreational level rugby union players, a population with no existing research in the sports injury literature, this heightened the risk.

Hardy et al (1996) encouraged the use of high impact studies which asks important questions, systematic in their approach to strive to develop or expand theory. The programme of research presented in this thesis does meet these criteria, also with the development of a population specific measure of the emotional response there are now increased possibilities to further test theories. The use of a range of quantitative and qualitative research methods can also be considered a key strength of this programme of research (e.g. semi-structured interviews, focus-groups, collaborative work, exploratory factor analysis, confirmatory factor analysis, correlational and regression analysis). Careful consideration was given towards the methodology although its role was purely as the mechanisms in which the research question was approached (Vealey, 1988). It was critical that the methodology did not drive the question. In addition, the four studies addressed a number of future research suggestions and recommendations of good practice from previous research, specifically:

- Tracey (2003) recommended that future qualitative research on the emotional responses following injury should use a prospective, longitudinal design to take into account their complex, transient nature. This was addressed in study 1.

- It has been recommended that, due to increased content validity, population specific measures are utilised wherever possible in relation to sports injury research (e.g. Evans et al, 2006; Evans and Hardy, 1999; Evans et al, 2008). The central purpose of the thesis was to develop a population specific measure and study 4 utilised a population specific measure of social support and perceived injury severity.

- Evans et al (2006) and Evans and Hardy (1999) recommended that future research should explore temporal changes in the emotional responses following injury; this was addressed in study 1.

- Walker, Thatcher and Lavalee (2007) recommended that future research needed to empirically research the integrated model of injury response. This was addressed throughout this programme of research although it is mindful that there are still aspects of the model that need further research.

- Johnson (2007) recommended researchers consider a homogenous sample in relation to sports participation level and sporting type when exploring the emotional responses following injury. This was addressed throughout this programme of research by using recreational level rugby union players throughout.

- Similarly, Levy et al (2009) recommended that more research is needed exploring the injury responses in non-elite level athletes. This was addressed throughout this programme of research.

- In conducting IPA, a small largely homogenous sample is recommended (Smith and Osborn, 2008). This was addressed in the IPA study (study 1).

- Collaborative research has been recommended in relation to sports injury research (Gilbourne, Taylor, Downie and Newton, 1996; Arvinen-Barrow et al, 2010). This was addressed in both study 2 and the content validity stage of study 3 as collaborations were made with chartered physiotherapists. This was also addressed in the planning of study 1 as collaborations were made with several rugby union clubs.

- Since Sim and Snell's (1996) recommendations that further focus group research is needed relating to physiotherapy and physiotherapists perceptions, very little published research has used this approach in this field. This was addressed in study 2.

- In exploratory scale development, it has been recommended that a number of mechanisms are used in the development of items, including the use of subject matter experts (e.g. Rattray and Jones, 2007; Rungtusanatham, 1998). This was addressed in study 3 with the use of interviews with injured athletes, a review of existing literature, focus groups with chartered physiotherapists, content validity collaboration with physiotherapists and piloting.

- In scale development, it has been recommended that in both exploratory and confirmatory factor analysis, large population specific sample sizes of in excess of 315 is considered appropriate even for the most complex of structures with non-normal data (Muthen and Muthen, 2002). This was addressed in both studies 3 and 4.

- Rattray and Jones (2007) recommended that a CFA should follow an EFA study in scale development using a different sample. Additionally, when conducting a CFA, multiple

assessments of model fit should be considered (e.g. Kline, 2010; Brown, 2006; Byrne, 2010; Harrington, 2009; Schreiber et al, 2006) and a CFA should be used as a tool for confirming a hypothesised structure and not as an exploratory tool (Hurley et al, 1997). These were all addressed in study 4.

- Biddle et al (2001) recommended the use of moderated hierarchical analysis as the most appropriate method in examining the stress-buffering hypothesis of social support. This was addressed in study 4.

7.6 Future research directions.

As a consequence of this programme of research a number of future research recommendations have been highlighted. These have been outlined in relevant empirical study chapters, particularly study 4 (Chapter 6) as this was the final empirical study in the programme of research. However, a summary of the key future directions and recommendations is also presented in this section.

First, given the exploratory nature of the first two studies specifically, it could be stated that replication is needed to substantiate the findings in these two studies. Second, with the development of a population specific measure of the emotional response following injury, it may be possible to employ a more interdisciplinary, heuristic approach to injury research. The collaborative links established with the chartered physiotherapists may also assist in providing more interdisciplinary research. Evans et al (2006) suggested that interaction between physical, psychological, biomechanical, medical and sociological variables in injury research need to be further examined. Indeed, Brewer et al's (2002) biopsychosocial model of injury rehabilitation suggests the interaction between such variables is an important aspect in prediction injury rehabilitation outcomes. This model

has received limited empirical research and a future research direction would be to adopt interdisciplinary research to test this model more thoroughly.

Whilst the qualitative aspects of this programme of research utilised the perceptions of the emotional responses by both injured athletes and physiotherapists, future research could consider eliciting the perceptions of other networks involved in the injured athlete's life. Specifically: coaches, friends and family, teammates, work colleagues and other health practitioners to generate a more comprehensive account of the emotional responses following injury, factors that influence the emotional response and the relationship between the emotional response and rehabilitation behaviour. As reported in the first two studies and also postulated by the Wiese-Bjornstal et al (1998) model, social support networks, including all of the aforementioned individuals can impact on emotional and behavioural responses following injury.

In relation to the ERRUIS itself further research is needed to test the predictive validity of the measure. One plausible suggestion would be to examine hardiness characteristics of athletes before injury as Wadey et al (2012a) suggested that hardiness is a personality trait that is classed as relatively stable and can also impact on individuals' responses during sports injury. Specifically, Wadey et al (2012a) reported that individuals high in hardiness were more likely to report lower levels of negative psychological responses following injury than injured athletes low in hardiness. Therefore, it is plausible to infer that hardiness levels pre-injury may have a predictive quality in relation to the emotional responses during the injury period. However, as discussed throughout the programme of research, the factors that influence the emotional responses following injury are widespread, individualised and complex, consequently using stable pre-injury characteristics alone to assess the predictive validity of the ERRUIS might not be applicable as there will be too many confounding variables to feasibly consider. In addition, Nor and Anizu (2001) stated that further research was needed on the relationship between psychological hardiness and the injury response before interpretations could be made on its predictive impact.

Additionally, further research is needed to examine the validity and reliability of the ERRUIS in relation to non-recreational level injured athletes. This programme of research was conducted in part as a response to Levy et al's (2009) recommendations that further research was needed to examine the injury response in recreational level athletes. In addition, consideration was also given to Johnson's (2007) suggestions that homogenous sampling is required in exploring the injury response. As a consequence the entire programme of research, including the development of the ERRUIS, explored the emotional responses in recreational level rugby union players. Therefore, further research would be needed to assess the validity and reliability of the measure for other groups of injured athletes, such as elite level athletes or athletes who participate in a different sport. Whilst it has been acknowledged that empirical research into injured recreational level athletes had been extremely limited, further prospective, longitudinal research is also needed in elite counterparts' responses.

Furthermore, whilst study 1 and study 2 reported that the frequency of the emotional response was an important factor in the behavioural responses following injury, these studies also did note the importance of the intensity of the emotions as part of the injury response. The ERRUIS in its current format considers the frequency of the emotional response during the injury journey. Study 4 suggested that both social support and perceived injury severity can impact on the frequency of emotional responses following injury, however future research should further explore the impact of such factors on the intensity of the emotional response. In sport psychology scales have been successfully adapted to include different measures for the same items. For example, Jones and Swain (1992) adapted the CSAI-2 (Martens et al, 1990) to include a directional scale and subsequent empirical studies have suggested that it is the direction of the perception of symptoms of anxiety which is a stronger predictor of athletic performance as opposed to the intensity of anxiety which was the feature of the scale in its original format. Therefore, further exploration into the impact of the intensity of the emotional response would be an important avenue of future research. This may lead to adapting the ERRUIS to consider the intensity, in addition to the frequency, of the emotional response.

As discussed throughout this programme of research, early research suggested that negative emotional responses were detrimental or counterproductive to the behavioural responses (e.g. Smith et al, 1990b; Gordon et al, 1998). However the qualitative studies reported supported more recent qualitative research (such as Tracey, 2003) in suggesting that this is not always the case. The interpretations of the qualitative studies of this programme of research suggested that emotional responses are further appraised and this appraisal process impacts on the behavioural response (see figure 7.1. for proposed amendment of the integrated model that highlights this). The appraisal process in relation to anxiety and sporting performance is not a new concept (Mellalieu, Hanton, and Fletcher, 2006), however the underlying relationship between the emotional and behavioural response does need further consideration in relation to sports injury. This is especially the case in relation to quantitative research and with the development of a population specific measure of emotional response it might be feasible to conduct such research in the future.

In relation specifically to the second stage of study 4, as the findings did not empirically support the notion of the stress-buffering effect of social support, a number of future research recommendations relating to exploring this in more detail have been proposed. First, it may be appropriate to examine the buffering qualities of specific types of social support, relating to sports injury response. Despite Rees et al (2010) suggesting that, in quantitative research methodology, injured athletes may not distinguish between the different types of social support and their different impact on the injury response, Mitchell et al (2013) quantitative study suggested that different forms of social support, such as tangible, esteem, emotional and informational support can impact on the injury response in specific ways. Therefore future research would need to address this further on a recreational level sample of injured athletes. Furthermore, future quantitative research should also examine the impact of the quality of the social support on the emotional response following injury. Whilst qualitative research (such as Bianco and Eklund, 2001; Abgarov et al, 2012; Udry et al, 1997a, Bianco 2001; Tracey, 2003; Robbins and Rosenfeld, 2001) has suggested that the quality of social support is instrumental to the

injury response, particularly in relation to the emotional response, the quantitative research exploring this has been severely limited. With the development of a population specific measure of emotional response, it is now plausible to examine the impact of social support quality on the emotional responses following injury.

The inconsistent findings relating to the stress-buffering effects of social support to the sports injury response also needs to be considered further. For example, the findings of study 4 of this programme of research were inconsistent in relation to Rees et al (2010) and both yielded different conclusions to Mitchell et al (2013). Indeed, Mitchell et al (2013) reported that actually finding empirical support for the stress buffering hypothesis is not uncommon in social support research. However, the interpretation of the interviews of injured athletes in study 1 suggested that social support did impact on the emotional response in situations of high stress in addition to the main effect qualities on the emotional response. This is consistent with other qualitative studies (e.g. Bianco et al, 1999; Tracey, 2003). Consequently and in light of inconsistent quantitative research, further research is needed to explore the relationship between social support and the injury response. In relation to health psychology, qualitative research has discussed the mediating impact of social support in relation to the behavioural responses in situations of high stress. This is different conceptually to the stress-buffering hypothesis in relation to a sport injury setting as reported by Rees (2007). Furthermore, in other areas of psychology, interpretations of the stress-buffering hypothesis have suggested that social support has a mediating, not moderating impact on the stress response (e.g. Brissette et al, 2002; Aneshensel, 1992). Indeed, given the findings of study 4 reported a main effect relationship between social support and emotional response, a main effect relationship between perceived injury severity and the emotional response and a significant negative correlation between perceived injury severity and social support with no interactive effects between these two variables on the emotional response, it is plausible to suggest that future research could explore the mediating, in addition to the buffering effects of social support on the stress and the response. Therefore, future research should consider adopting mediational regression analysis in addition to moderated regression analysis to examine in more detail the impact of social support on the emotional responses following injury.

7.7 Conclusion.

The overarching aim of this thesis was to provide a detailed, systematic, programme of research exploring the emotional responses following injury with the ultimate purpose of developing and providing initial validation of a population specific measure of the emotional responses following injury. Findings from the four studies that made up the programme of research demonstrated the transient nature of the emotional response and that recreational level athletes also make major investments to their sport and, consequently, the emotional responses following injury are widespread and can have a major impact on their well-being. The findings of the qualitative aspects of this programme of research both extended and suggested amendments to the Wiese-Bjornstal et al (1998) model, particularly regarding the relationship between the emotional and behavioural responses. In addition, in comparing the findings of study 2 with Arvinen-Barrow et al's (2010) conclusions, there would appear to be inconsistencies in the level of training and application of psychological skills techniques to enhance positive emotional and behavioural responses following injury in UK chartered NHS physiotherapists. Greater consistency in the level of training would be encouraged in future. The final two studies reported the processes of validating the ERRUIS. Both EFA and CFA research was conducted and the final version of the ERRUIS demonstrated acceptable levels of content, construct and convergent validity in addition to strong internal reliability of the scale. Specifically, study 4 highlighted the main effect relationships of social support and perceived injury severity on the frequency of emotional responses following injury. Taken as four systematic studies, it is believed that this programme of research has achieved its purpose. In addition, these studies have implications for rehabilitation professionals, sports psychologists and coaches who have a vested interest of facilitating both the emotional and behavioural responses following injury. Whilst further testing is necessary, the ERRUIS is a tool that can be used to further enhance the knowledge and understanding of this complex area of sport psychology.

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PSYCHOLOGY DEPARTMENTAL ETHICS PANEL

Initial Submission Date : 18/2/2010	**Resubmission Date(s) :**
Student name : STUART JONES	**Student no: 99019337**
Supervisor : Dr Gareth Roderique-Davies	
Is this to be submitted to an NHS Local Research Ethics Committee? NO **If Yes please name LREC :**	**Has Criminal Records Bureau clearance been sought?** NOT APPLICABLE not applicable

Working title of project : Exploring the emotional response following injury in recreational team sport players.

Brief background /rationale for research (include references to literature): [up to 500 words]

Participating in physical activity involves the risk of injury. In 1996, sport and exercise was the leading source injury in the United Kingdom, accounting for approximately thirty three percent of all injuries (Uitenbroak, 1996; cited in Johnson, 2007). Hackfort and Kleinert (2007) reported that in Germany up to one million injuries are registered every year, costing approximately one billion euros in medical treatment. It can be postulated that the likelihood of becoming injured while engaging in sports, resulting in a disruption of participation, is statistically high (Johnson, 2007).

An important factor that contributes to recovery is adherence to the rehabilitation program prescribed by the medical practitioners. Wiese-Bjornstal, Smith, Shaffer, and Morrey's (1998) Integrated Model of Response has been widely considered as the most comprehensive framework highlighting the factors that influence adherence. The model states that it is the athlete's appraisal of pre and post-injury factors which are thought to influence cognitions, emotions and behaviour. Wiese-Bjornstal et al. (1998) posit that both personal and situational factors can impact upon the injured athlete's responses whereas the process of appraisal mediates self-perception and the sense of the loss. The latter is important, given that Wiese-Bjornstal et al. suggest the model also has the potential to account for responses characteristic of grief.

Despite being widely regarded as the most comprehensive in the area there are many questions still to be answered concerning Wiese-Bjornstal et al's (1998) model. For example, the model suggests a strong relationship between the emotional and behavioural response following injury. However, it has been noted that the research specifically exploring the relationship between the emotional and behavioural response is very limited (Walker, Thatcher and Lavallee 2007). Similarly, Johnson (2007) highlighted that a number of situational factors, proposed by Wiese-Bjornstal et al (1998), have not been thoroughly investigated. A lack of homogeneous sample in the majority of existing literature signifies that factors such as sporting type and athletic ability level need further research (Johnson, 2007).

Whilst several studies have highlighted numerous emotions that an athlete can experience following injury, it is unclear what affect, if any, these emotions have on the behavioural response. In other areas of health research, a large body of studies specifically examining the relationship between negative emotions and adherence have reported significant relationship (e.g. Mohr et al, 1997; Kronish et al, 2006; Kalsekar et al, 2006; Sirrey et al, 2007; DiMatteo et al, 2000; Luyester et al, 2009)..

A recent review of the sports injury literature (Evans, Mitchell and Jones, 2006) has highlighted the need to further research the emotional responses following injury. At this present time, the relationship between the emotional response following injury and athletes' behaviour remains unclear. It could be postulated that it is the appraisal of the emotional response is critical to the behavioural response; this would be in line with the school of thought in sport psychology exploring the symptoms of anxiety in competitive athletes (e.g. Jones and Swain, 1992). Several studies (e.g. Jones, Hanton and Swain, 1994; Hanton, Mellalieu and Hall, 2004; Jones, 1995) have highlighted the importance of athletes appraisal of their emotional response to a source of stress. In some cases, more regularly demonstrated with elite level athletes (Jones, Hanton and Swain, 1994), athletes can appraise the symptoms of anxiety (as a result of encountering a source of stress) as facilitative and can actually have a beneficial effect on their behavioural response, such as increases in motivation level (Jones et al, 1994) and Self-Confidence levels (Hanton et al, 2004), both components are deemed important in adherence to sports injury rehabilitation treatment (Evans et al, 2006).

However, it could also be proposed that the relationship between the emotional response and the athlete's behaviour following injury would be in line with the current research findings in other health areas measuring treatment adherence (e.g. Mohr et al, 1997; Kronish et al, 2006; Kalsekar et al, 2006; DiMatteo et al, 2000; Sirrey et al, 2007; Luyester et al, 2009). Walker, Thatcher and Lavallee (2007) critical review of the psychological responses following injury put forward that further research is needed speculating that the relationship between the emotional and behavioural response is far more complicated than early models postulate.

There has been much literature investigating the use of social support following injury (Evans et al, 2006). The amount and type of social support is considered a critical factor in the behavioural response following injury according to Wiese-Bjornstal et al's (1998) model. However, it has been highlighted that further research is required examining the relationship between perceptions of social support and rehabilitation adherence, and also social support and the emotional response

following injury (Johnson, 2007). Presently, the relationship between social support and the emotional and behavioural response has not been investigated thoroughly.

The rationale of this INITIAL research is to provide some initial findings to the research questions and limitations of existing research reported in the literature review. Specifically, to provide some initial exploration into the relationship between the emotional and behavioural response following injury. To investigate what personal and situational factors influence the emotional response and how, if indeed it does at all, does this influence the behavioural response and the athlete's adherence.

By qualitatively assessing a homogeneous sample over a longitudinal study, it is hoped that initial findings to numerous other research questions will be answered. For example, the emotional response following injury and exploring its relationship with perceptions of injury rehabilitation adherence for a specific group of people. The study will also provide an initial investigation into the relationship between social support and the emotional response following injury, this is in order to investigate how social support can influence the emotional and behavioural response following injury.

Brief description of methodology (include hypotheses, participants, procedure etc): [up to 500 words]

Research Design and Procedure.

Many studies in the sports-injury literature have highlighted the problems in conducting retrospective interviews on injured athletes (e.g. Levy et al, 2009). Such problems include a decay of memory trace and end result participation bias (Evans et al, 2006). Therefore, in line with Tracey (2003) and based on the recommendations proposed by Evans et al, 2006), a longitudinal, prospective, research design using recreational team sport athletes who have sustained a mid to long term injury will be implemented.

Prior to the data collection, the researcher will contact the coaches, individually and separately, at six Rugby clubs in Pembrokeshire and Carmarthenshire areas. The researcher will contact the coaches to discuss the outline of the study and briefly explain the procedure.

It would be explained to the coaches how their cooperation is needed as the researcher is investigating participants who get injured over the course of the season by interviewing the athlete of three different phases, the first being within a week of the injury occurring. The researcher aims to contact the coach on a weekly basis, after a weekend fixture, to discuss if any injuries took place and to provide contact details to an athlete who has suffered an injury in that week. At this stage, the researcher will explain to the coach that no manipulation will be involved, each interview will be conducted confidentially within the rules of the data protection act and that both the coach, and the participant, reserve the right to withdraw at any period.

Should the coach verbally accept to allow his players to potentially be part of the study, the researcher will arrange with each coach to meet the players of the six clubs at a regular training session. At the training session, the researcher will talk to the players as a group. The researcher will discuss the aim of the study and talk about the research design, allowing for any player who does not wish to have any involvement to indicate this to the researcher. At this stage, the researcher will also obtain signed consent (via a consent form) from the coaches, highlighting that the researcher will contact the coach on a weekly basis to discuss injuries and that the coach would provide a telephone contact detail to a player who has suffered an injury. This will also be verbally told to the Rugby players at the training session. The consent form will also indicate that the coach reserves the right to withdraw a member of his club from the study.

These will not be professional clubs, although each of the clubs will have a full first team squad, a second team squad, in addition to other playing members over the eighteen. Therefore, a total of approximately sixty rugby players over the age of eighteen will be playing members of each club.

In line with Tracey (2003) research, participants will discuss their perspectives on sports injury rehabilitation adherence in semi structured interviews taken at three different phases of the rehabilitation processes. Prior to each interview, participants will sign a consent form, highlighting the nature of the study, the confidentiality of the data, and explaining the participant reserves the right to withdraw at any point.

The first will take place within a week of the injury occurring. Second interview will take place at approximately the mid phases of the recovery process. In order to define an appropriate mid point, the researcher will telephoning the participant at regular intervals for an update on the injury and anticipated recovery time. The mid point will be when the participant is at the halfway stage of the rehabilitation process. The final interview will take place as the athlete is reaching a full time return to sport. Regular contact between the researcher and the participant will be made in order to establish when the athlete is nearing the end of the rehabilitation treatment.

Each interview will be semi structured, drawing upon the athletes' emotional response following injury and how this has influenced their own perceptions of injury rehabilitation adherence. The interviews will also consider the role of social support and its relationship with the emotional and behavioural response following injury. An interview schedule for each stage is included in the appendices. Each interview will approximately last one hour in duration, will be recorded and later transcribed in full.

The interviews will be securely stored using a Dictaphone. The researcher will keep the Dictaphone in a locked safe. The data from the Dictaphone will be transcribed, again all information will be retained securely and only in the procession of the principle researcher. This electronic information will be stored on a password protected laptop that the researcher will keep protected.

Participant confidentiality will be of paramount importance and the researcher will omit any information that could reveal the participants identity when transcribing. Following competition of the proposed research, should the data not form part of another study, then the all of the information (taped interviews and transcription) will

be destroyed.

The interviews will be analysed using Interpretative Phenomenological Analysis (IPA, Smith 1996). This is because the aim of study is to explore the athletes' perceptions of injury, investigating "how" and "why" being injured affects them emotionally and then exploring if, how and why the emotional response influences the behavioural response (self perceptions of adherence). IPA is a method of qualitative analysis which is focused on the meaning that such a phenomena has on an individual, not just eliciting facts about a phenomena (Smith, Flowers and Osborn, 1997). This approach has been used extensively in Health Psychology (e.g. Walker et al. (2006). It has also been recommended when interviewing an individual with a specific experience or expertise in the area (e.g. Arvinen-Barrow et al, 2010) and when dealing with individuals' emotional response (Mann and Abraham, 2006).

Participants.

This study intends to specifically explore an area in the sports injury rehabilitation literature that has yet to be fully investigated, and as this is an initial study for potentially wider research it is critical that theoretical saturation is achieved. As a consequence, the number of participants required in this study cannot be firmly quantified. Studies relating to this proposed research achieved theoretical saturation using relatively small sample sizes. For example, Levy et al (2009) used six participants in their study, Evans, Hare and Mullen et al (2006) study comprised of four athletes. Indeed, longitudinal studies of this nature often just use a single case study (e.g. Hare et al, 2008; Carson and Polman 2008). Therefore, using these studies as a guideline, it could be speculated that ten participants will be the maximum needed to gain theoretical saturation.

All participants will be over the age of eighteen, never previously played sport at a professional or elite level, and all playing members of a rugby club in Pembrokeshire or Carmarthenshire. Recreational level athletes are being used as Johnson (2007) recommended future research in this area should focus on non-professional athletes. The aim of the study is to explore how the emotional response influences perceptions of rehabilitation adherence. Therefore, the participants would have sustained an injury severe enough to

- Be unable to participate in the sport for a minimum of four weeks (in line with Tracey's study). Therefore the minimum period in which the second interview will commence is two weeks after the first interview.
- Require medical treatment and a rehabilitation programme.

Whilst an interesting aspect of this research will be investigating what influence the type severity of injury has on the emotional and behavioural response. Athletes with longer term injuries (over 3 months) will not be involved in the longitudinal aspect of the study. However, data at the initial phases of injury rehabilitation will be taken for athletes with such longer term injuries and this will still provide a fascinating insight into the initial emotional response with those with a longer term injuries.

	Ethics Check list	YES	NO	N/A
1.	Will you obtain written consent for participation ?	√		
2.	Will you tell participants that they may withdraw from the research at any time?	√		
3.	If the research is observational, will you ask participants for their consent to being observed?			√
4.	Will you tell participants that their data will be treated with full confidentiality and that they will not be identified?	√		
5.	Will you debrief participants at the end of their involvement?	√		
	If you have answered NO to one of questions 1 -5 you MUST explain below			√
6.	Will your project involve deliberately misleading participants in any way?		√	
7.	Is there a realistic risk of physical or psychological distress or discomfort for participants?		√	
8.	Does your project involve children or other vulnerable populations?		√	
	If you have answered 'YES' to one of questions 6 -8 you MUST explain below			√

Please give an explanation for how you will address any ethical implications that are apparent from your responses to the above checklist.

Participants would have signed a consent form prior to each sequence of data collection. These consent forms will explain how the participant has the right to drop out at any period of the study and that all the qualitative and quantitative data will remain confidential. Participants will be debriefed at the end of the study and the study will comply with the data protection act.

In addition to this, the coaches/management of the participants rugby team reserves the right to withdraw the participant from the study.

Each interview will be recorded via a Dictaphone, it will be stored securely and only the principle researcher will retain a recorded copy of the interviews. The researcher will keep the Dictaphone in a locked safe. The data from the Dictaphone will be transcribed, again all information will be retained securely and only in the procession of the principle researcher. This electronic information will be stored on a password protected laptop that the researcher will keep protected.

Participant confidentiality will be of paramount importance and the researcher will omit any information that could reveal the participants identity when transcribing.

Following competition of the proposed research, should the data not form part of another study, then the all of the information (taped interviews and transcription) will be destroyed.

It is critical that the research minimises any potential distress that the participant may encounter in recalling his/her emotional response following injury. The interviews will take place at a time and location of the participants choosing, this is in order for the participant to feel as relaxed as possible. The participant has the right to postpone/reschedule/cancel any interview before hand, and also during the interview. It is predicted that the each interview will last 1 hour in duration, although if the participant feels more comfortable conducting the interview of multiple sessions then the research will respect and adhere to this.

It is possible that discussing an injury could be a source of trauma for the participant and the researcher will be aware of this. Appropriate helpline numbers will be made available to participants, an example of this is the Pembrokeshire Counseling Service. It is important that the research is aware if the interview is becoming too distressing to the participant/ The participants will be debriefed and reminded about the study's aim at the end of each interview.

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Student's signature  Date 18/2/2010

(Supervisor signature required prior to submission)

I have checked this form and believe that the student has supplied the necessary information

Supervisor's signature 

---------- Forwarded message ----------
From: **John B (HASS)** <bjohn1@glam.ac.uk>
Date: 30 March 2010 16:10
Subject: RE: Ethics.
To: Stuart Jones <99019337@glam.ac.uk>
Cc: "Roderique-Davies G (HASS)" <gdavie10@glam.ac.uk>

Hi Stuart

I think you can assume that it will be fine to go ahead now.

I'll give you some feedback on the interview in the next couple of days.

Sorry about the Coventry job – but still all good experience

Cheers

Bev

Dr Bev John CPsychol AFBPsS

Reader in Psychology

Faculty of Humanities & Social Sciences

University of Glamorgan / Prifysgol Morgannwg

Pontypridd

CF37 1DL

Tel / Ffon: 01443 654145

bjohn1@glam.ac.uk

www.glam.ac.uk

PSYCHOLOGY DEPARTMENTAL ETHICS PANEL

Initial Submission Date : 10 / 05 / 2010	**Resubmission Date(s) :**
Student name : STUART JONES	**Student no: 99019337**
Supervisor : Dr Gareth Roderique-Davies	
Is this to be submitted to an NHS Local Research Ethics Committee? NO **If Yes please name LREC :**	**Has Criminal Records Bureau clearance been sought?** NOT APPLICABLE not applicable

Working title of project : Adherence to sport injury rehabilitation: Physiotherapists perspectives on the factors that influence adherence.

Brief background /rationale for research (include references to literature): [up to 500 words]

Participating in physical activity involves the risk of injury. In 1996, sport and exercise was the leading source injury in the United Kingdom, accounting for approximately thirty three percent of all injuries (Uitenbroak, 1996; cited in Johnson, 2007). Lewin's (1991) epidemiological study found that injury risk for elite football players in the United Kingdom during one season was 91%. Hackfort and Kleinert (2007) reported that in Germany up to one million injuries are registered every year, costing approximately one billion euros in medical treatment. It can be postulated that the likelihood of becoming injured while engaging in sports, resulting in a disruption of participation, is statistically high (Johnson, 2007).

An important factor that contributes to recovery is adherence to the rehabilitation program prescribed by the medical practitioners. Recent research examining adherence to rehabilitation has demonstrated the full extent of the challenge facing sports injury practitioners. For example, recent estimates of adherence to prescribed rehabilitation regimens have ranged from 40-91% (Alkmekinders & Alkmekinders, 1994; Daly et al., 1995; Laubach, Brewer, Van Raalte, & Petitpas, 1996; Taylor and May, 1996; Vasey, 1990; Sluijs, Kok, & van der Zee, 1993). These figures reinforce the need for empirical research that examines the factors that affect athletes'

rehabilitation adherence which has also been described by Bassett (2003) as the greatest challenge that faces a sport injury rehabilitation practitioner. More research is needed to try and combat this problem, especially as career termination following an injury often results in feeling of severe depression (Bond, 1998).

In the most recent review of literature in this field, Evans, Mitchell and Jones (2006) highlighted that the most comprehensive model to explain the processes that underpin the emotional and behavioral response following injury is Wiese-Bjornstal, Smith, Shaffer, and Morrey's (1998) Integrated Model of Response. This stress based cognitive appraisal model suggests that both pre-injury and post-injury factors influence emotional response. Wiese-Bjornstal et al. (1998) posit that both personal (e.g., injury variables such as injury history, individual difference variables such as motivation, demographic variables such as age, and physical variables such as health status), and situational factors (e.g., sport, social, and environmental) can impact upon the injured athlete's responses whereas the process of appraisal mediates self-perception and the sense of the loss. Despite being considered the most comprehensive in this area, many of the personal and situational variables included in Wiese-Bjornstal's et al (1998) model, thought to influence the emotional response and behavioural outcomes following injury have still not been thoroughly investigated. Johnson (2007) reported that a significant amount of research exploring the emotional response following injury was needed.

The current trend of research in this area, whilst not without its criticism (e.g. Johnson, 2007) is primarily quantitative in nature and the need for a qualitative research design focusing on the perceptions of injury and its impact on the individuals behavioural response has been emphasised (e.g. Evans et al, 2006). However, even the studies that have adopted a qualitative approach have used very small sample sizes, often even individual case studies and, as a consequence, it is difficult to substantiate if such emotional and behavioural responses can be generalised to wider populations under different situations (e.g. injury severity, athletic level, history of injury etc).

One group of people who have an invaluable experience with the behavioural response following injury, and dealing with issues affecting motivation and adherence to treatment are rehabilitation practitioners, such as physiotherapists (Bassett, 2003). A search of existing literature revealed just a single qualitative study exploring physiotherapists' perceptions in relation to sports injury adherence (Arvinen-Barrow et al, 2010). This study adopted an Interpretative Phenomenological Analysis approach to explore physiotherapists' experiences and perceptions of psychological skills highlighted the lack of formal training that physiotherapist have in psychological skills. Nevertheless, Arvinen-Barrow et al (2010) reported that physiotherapists do perceive psychological skills as important in the recovery process. As a consequence, physiotherapists do actively encourage the use of goal setting, imagery, positive self-talk and relaxation approaches, as part of their service although stated that more formal training, or the use of psychologists as part of the rehabilitation processes should be encouraged

However, whilst that study advanced the knowledge of rehabilitation practitioners' opinion on psychological interventions in regards to injury rehabilitation, there has been no qualitative study exploring physiotherapists' perceptions on the barriers and facilitators in sports injury rehabilitation adherence. Although, physiotherapists perceptions on the barriers and facilitators to treatment adherence has been studied with regards to patients with non-sporting chronic back pain (Cote et al, 2009). Given that physiotherapists treat, on a daily basis, athletes of a wide range of ability level, sporting type and injury their experiences would be invaluable to further the knowledge in this area (Arvinen-Barrow et al, 2010).

The aim of the proposed research is to further advance the knowledge on the emotional and behavioural response following injury through exploring the perceptions of physiotherapists on factors that influence adherence. This study is a natural follow up to a design. Tracey (2003) reported that injured athletes' perceive the physiotherapist as playing a pivotal role in rehabilitation motivation and adherence although no research has been conducted exploring the physiotherapist's perspectives on their role in facilitating adherence. Therefore, a study exploring the physiotherapists' perceptions of rehabilitation adherence would further our existing knowledge on the factors that influence the emotional and behavioural response following injury. Exploring physiotherapists' perspectives would also enable researchers to become aware of existing strategies adopted to facilitate adherence, and to use the physiotherapists' knowledge and experience to design a feasible and applicable adherence intervention strategy that would have their support.

The proposed study is a critical aspect of the researcher's PhD research examining the emotional and behavioural response following injury. It is aimed to further the existing literature providing further research into the factors proposed by Weise-Bjornstal et al's (1998) model. Through exploring physiotherapists' perspectives on injured athletes' responses following injury knowledge will be moved forward in two key areas:

1) To establish from a Physiotherapists' point of view the barriers and facilitators in injured athletes' adherence to rehabilitation treatment. This study will explore the strategies applied by Physiotherapists in overcoming the barriers, exploring barriers that the physiotherapists find difficult to empathise with, or difficult to overcome.

2) To expand on Arvinen-Barrow et al's (2010) study exploring the Physiotherapists' perceptions of applying psychological skills (e.g. Goal Setting, Relaxation strategies etc) in enhancing adherence. Exploring the formal training they have in applying such techniques. This study will explore the Physiotherapists' perspectives of the importance in their role in rehabilitation adherence, expanding from the work conducted by Tracey (2003).

This study forms the second aspect of the PhD research, the conclusions of this research will form the basis of the next aspect which will be the

development of an intervention strategy aimed at facilitating adherence.

Brief description of methodology (include hypotheses, participants, procedure etc): [up to 500 words]

Research Design Justification.

Focus groups are being increasingly adopted in health research particularly when exploring the reasons why people behave as they do in addition to their perceptions of a situation (Rabiee, 2004). A focus group has been defined as a technique involving the use of in-depth group interviews in which participants are selected because they are focused on a given topic and therefore chosen because they have something to say on the area being researched (Burrows and Kendall, 1997). Participants selected for focus group research are also comfortable talking to the interviewer and each other (Rabiee, 2004). One of the distinct features of focus-group interviews is its group dynamics; hence the type and range of data generated through the social interaction of the group are often deeper and richer than those obtained via individual interviews (Rabiee, 2004). Focus group interviews are becoming an increasingly popular method in the initial justification stage of an intervention strategy (e.g. Sturt et al, 2006). It is for these reasoning that the proposed research, which aims to explore the factors that influence rehabilitation adherence from a physiotherapist perspective, will be explored qualitative via focus group interviews with physiotherapists.

Participants.

The participants involved in this proposed research will be seven UK chartered physiotherapists who will form the focus group. This is based on the suggestions of Krueger and Casey (2000) who recommended that the optimum number of participants for focus group study in health based research should be between six and eight participants. As this study is one of the first to investigate the emotional and behavioural response following injury from a physiotherapists perspective, it is essential that the opinion of physiotherapists employed by the National Health Service and those who work in private clinics are incorporated into the focus group in order to get as varied a range of experiences for the focus group discussions. Therefore, four of these physiotherapists will work be working within the NHS, with the other three working in private clinics.

It is essential that the physiotherapists involved in the focus group meeting will have much experience in sports injury rehabilitation, therefore each participant will have worked as a fully qualified physiotherapist for a minimum of three years. Participant selection will based from the researcher's contacts, as the researcher has a previous professional relationship with a number of NHS hospitals and private rehabilitation clinics.

Procedure

Prior to data collection, the researcher will contact each physiotherapist selected to be part of the focus group separately to discuss the nature of the study and its aims and objectives. It is during this telephone based conversations where the researcher discusses a suitable (neutral) venue and time that would be appropriate for each member of the focus group to converge.

Based on the recommendations put forward by Rabiee (2004), due to the wide range of information being researched two separate focus group meetings are to be scheduled. This is because, it has been recommended that focus group meetings lasting approximately one-two hours in duration directed at answering a more narrow research question is more effective than longer sessions. Therefore, it has been recommended that in such scenarios in which the researcher has many research aims and objectives, separate focus groups should be carried out (Rabiee, 2004). The same participants will be used for the two focus groups.

The procedure and data analysis for each focus group will be the same. A schedule based on the recommendations put forward by Rabiee (2004) has been provided for the two separate focus groups. The first focus group meeting will establish from a Physiotherapists' point of view the barriers and facilitators in injured athletes' adherence to rehabilitation treatment. This session will explore the strategies applied by Physiotherapists in overcoming the barriers, exploring barriers that the physiotherapists find difficult to empathise with, or difficult to overcome.

The second schedule focus group meeting will draw upon the Physiotherapists' perceptions of applying psychological skills (e.g. Goal Setting, Relaxation strategies etc) in enhancing adherence. Exploring the formal training they have in applying such techniques. In this focus group session the Physiotherapists' perspectives of the importance in their role in rehabilitation adherence will also be considered in addition to discussing potential intervention strategies to enhance adherence.

Prior to the commencing each focus group session each participant will sign a consent form, highlighting the nature of the study, the confidentiality of the data, and explaining that the participant reserves the right to withdraw at any point.

The focus group interviews will each approximately last one hour in duration they will be recorded and later transcribed in full. The interviews will be securely stored using a Dictaphone. The researcher will keep the Dictaphone in a locked safe. The data from the Dictaphone will be transcribed, again all information will be retained securely and only in the procession of the principle researcher. This electronic information will be stored on a password protected laptop that the researcher will keep protected.

Participant confidentiality will be of paramount importance and the researcher will omit any information that could reveal the participants identity when transcribing. Additionally, should the physiotherapist choose to discuss an

individual patient, then any information that could reveal this persons identity will be omitted when transcribing. Following competition of the proposed research, should the data not form part of another study, then the all of the information (taped interviews and transcription) will be destroyed.

Data Analysis.

Each focus group will be analysed using framework analysis (Kreuger, 1994). Framework analysis has been extensively adopted in focus group studies in health related research. Framework analysis has been defined as 'an analytical process which involves a number of distinct though highly interconnected stages' (Ritchie and Spencer, 1994). The five key stages are: familiarization and identifying a thematic framework; indexing; charting; mapping and interpretation. Whilst framework analysis uses a thematic approach, it allows themes to develop both from the research questions and from the narratives of participants.

	Ethics Check list	YES	NO	N/A
1.	Will you obtain written consent for participation ?	√		
2.	Will you tell participants that they may withdraw from the research at any time?	√		
3.	If the research is observational, will you ask participants for their consent to being observed?			√
4.	Will you tell participants that their data will be treated with full confidentiality and that they will not be identified?	√		
5.	Will you debrief participants at the end of their involvement?	√		
	If you have answered NO to one of questions 1 -5 you MUST explain below			√
6.	Will your project involve deliberately misleading participants in any way?		√	
7.	Is there a realistic risk of physical or psychological distress or discomfort for participants?		√	
8.	Does your project involve children or other vulnerable populations?		√	
	If you have answered 'YES' to one of questions 6 -8 you MUST explain below			√

Please give an explanation for how you will address any ethical implications that are apparent from your responses to the above checklist.

Participants would have signed a consent form prior to each sequence of data collection. These consent forms will explain how the participant has the right to drop out at any period of the study and that all the qualitative and quantitative data will remain confidential. As the participants will be discussing events that have taken place in their working environment the consent form will also explain how no specific case will be discussed with anybody else. Participants will be debriefed at the end of the study and the study will comply with the data protection act.

Each interview will be recorded via a Dictaphone, it will be stored securely and only the principle researcher will retain a recorded copy of the interviews. The researcher will keep the Dictaphone in a locked safe. The data from the Dictaphone will be transcribed, again all information will be retained securely and only in the procession of the principle researcher. This electronic information will be stored on a password protected laptop that the researcher will keep protected.

Participant confidentiality will be of paramount importance and the researcher will omit any information that could reveal the participants identity when transcribing. In addition, should any participant discuss about a specific patient the research will omit any information that could reveal this patients identity when transcribing. Following competition of the proposed research, should the data not form part of another study, then the all of the information (taped interviews and transcription) will be destroyed.

It is critical that the research minimises any potential distress that the participant may encounter in recalling an experience of rehabilitating an injury. The interviews will take place at a time and location of the participants choosing, this is in order for the participant to feel as relaxed as possible. The participant has the right to postpone/reschedule/cancel any interview before hand, and also during the interview. It is predicted that the each interview will last 1 hour in duration, although if the participant feels more comfortable conducting the interview of multiple sessions then the research will respect and adhere to this.

It is possible that discussing an experience in rehabilitation could be a source of trauma for a participant. In addition, it could be a source of trauma for the other participants who are listening to this experience Appropriate helpline numbers will be made available to participants, an example of this is the Pembrokeshire Counseling Service. It is important that the research is aware if the discussion is becoming too distressing a participant/s. The participants will be debriefed and reminded about the study's aim at the end of each interview.

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Student's signature _____ Date 10/5/2010

(Supervisor signature required prior to submission)

I have checked this form and believe that the student has supplied the necessary information

Supervisor's signature _____

---------- Forwarded message ----------
From: **John B (HASS)** <bjohn1@glam.ac.uk>
Date: 17 May 2010 11:56
Subject: RE: Physiotherapist focus group study.
To: Stuart Jones <99019337@glam.ac.uk>
Cc: "Roderique-Davies G (HASS)" <gdavie10@glam.ac.uk>, Stuart Jones <stuartanthonyjones@hotmail.com>

Hi Stuart

You're fine to proceed with the study. Keep us posted

cheers

Bev

Dr Bev John CPsychol AFBPsS

Head of Research & Reader in Psychology

Division of Psychology

Faculty of Humanities & Social Sciences

University of Glamorgan / Prifysgol Morgannwg

Pontypridd

CF37 1DL

Tel / Ffon: 01443 654145

bjohn1@glam.ac.uk

www.glam.ac.uk

PSYCHOLOGY DEPARTMENTAL ETHICS PANEL

Initial Submission Date : 10 / 11 / 2010	**Resubmission Date(s) :**
Student name : STUART JONES	**Student no: 99019337**
Supervisor : Dr Gareth Roderique-Davies	
Is this to be submitted to an NHS Local Research Ethics Committee? NO **If Yes please name LREC :**	**Has Criminal Records Bureau clearance been sought?** NOT APPLICABLE not applicable

Working title of project : An exploratory factor analysis of the Emotional Responses to Rugby Union Scale.

Brief background /rationale for research (include references to literature): [up to 500 words]

Participating in physical activity involves the risk of injury. In 1996, sport and exercise was the leading source injury in the United Kingdom, accounting for approximately thirty three percent of all injuries (Uitenbroak, 1996; cited in Johnson, 2007). Lewin's (1991) epidemiological study found that injury risk for elite football players in the United Kingdom during one season was 91%.

Participants in high contact or collision sports are at an increased risk to injury occurrence than those who partake in non-contact sports. Hillman (2000) noted that athletes who participate in high contact activities, in which Rugby Union would be categorised, have a higher risk for potential fatalities and severe orthopaedic injuries in comparison to non-contact sports. High contact sports also have a greater potential risk for catastrophic head and neck injuries. In a review that explored the neurological assessments for amateur level athletes, Broshek and Barth (2001) reported that Rugby has the third highest incidence rate with regards to concussive injuries. In a list that compared the rate of concussive injuries in different sports, they noted that equestrian sports has the highest incidence of concussive injuries, this is followed by Boxing, Rugby, Association Football and American Football (Broshek and Barth, 2001). Hackfort and Kleinert (2007) reported that in Germany up to one million injuries are registered every year, costing

approximately one billion euros in medical treatment. It can be postulated that the likelihood of becoming injured while engaging in sports, resulting in a disruption of participation, is statistically high (Johnson, 2007).

Such figures, in addition to the statistics relating to non-adherence to medical treatment and physiotherapy (see Evans et al, 2006 for a review of this literature) has led to an increased research from psychologists in to the emotional responses following injury in an attempt to establish a link between the emotional responses following injury and adherence to treatment (Arvinen-Barrow et al, 2010). However, a critique of previous research was noted by Evans et al (2008) who highlighted a lack of specific measures that explore the emotional responses following injury. In the main researchers have relied on measures such as the Profile of Mood States (McNair, 1969) that was not developed using injured athletes and therefore researchers, such as Evans et al (2008) have questioned the validity of sports injury research using this tool.

As this has been considered a priority in sport injury research (Johnson, 2007) and also to address the issue of a lack of research exploring the emotional responses in recreational level athletes, the overriding aim of this researchers PhD study is to develop a measure that has been specifically designed and with initial validation on a specific group of injured athletes, that is recreational rugby players. The aim of this study is too provide an initial validation, via exploratory factor analysis, of a scale that has been developed through two previous studies, as part of the PhD journey, using a variety of methods and approved by the University of Glamorgan Ethics Panel.

Brief description of methodology (include hypotheses, participants, procedure etc): [up to 500 words]

The study is entirely quantitative in design, each participant will the proposed Emotional Responses to Rugby Union Injury Inventory which has been developed as part of this ongoing PhD (see attached questionnaire). This is a 56 item, 5 point, frequency scale that has been developed following extensive qualitative research.

A demographic questionnaire will also be used (see attached) to assess if the participants fit the specific criteria for the study in terms of athletic ability level and injury.

Procedure
According to Costello and Osborne, 2007 it is recommended that a large sample size to conduct a EFA should exceed 200 or have a ratio of 10 participants per item measured. Therefore a sample size of a minimum of 560 injured recreational rugby players need to be obtained.

To fit the criteria of the study, participants must be a recreational level rugby player and also currently injured in which they have been unable to

participate for a minimum of two consecutive weeks or training or match games as a result of the injury (Tracey, 2003). This will be noted in the demographic questionnaires. Participants will be obtained via two main methods.

1) Sample from patients currently seeking medical support from chartered physiotherapists (both NHS and private), sport injury therapists, GP referral and at rugby union clubs.
2) Online survey using surveymonkey.

Participants who do not meet the criteria in terms of time sports participation missed or athletic ability level will be omitted from the data analysis. All such information will be obtained via the demographic questionnaire (see attached). This questionnaire has been based on previous measures by Smith et al (1990).

Participants would then complete the ERRUIS.

The facotorial validity of the scale will then be measured via an exploratory factor analysis using SPSS, this procedure is in line with Rattray and Jones, 2007). Further correlational analysis will also be conducted using SPSS.

	Ethics Check list	YES	NO	N/A
1.	Will you obtain written consent for participation ?	√		
2.	Will you tell participants that they may withdraw from the research at any time?	√		
3.	If the research is observational, will you ask participants for their consent to being observed?			√
4.	Will you tell participants that their data will be treated with full confidentiality and that they will not be identified?	√		
5.	Will you debrief participants at the end of their involvement?	√		
	If you have answered NO to one of questions 1 -5 you MUST explain below			√
6.	Will your project involve deliberately misleading participants in any way?		√	
7.	Is there a realistic risk of physical or psychological distress or discomfort for participants?		√	
8.	Does your project involve children or other vulnerable		√	

	populations?			
	If you have answered 'YES' to one of questions 6 -8 you MUST explain below			√

Please give an explanation for how you will address any ethical implications that are apparent from your responses to the above checklist.

There is a minimal risk as the participants as this study involves no deception. The researcher is aware that as the questionnaire is asking to recall their emotional responses following a current injury, this could be potentially distressing for some participants and could lead to them experiencing a significantly more negative mood by the end of the study compared to at the beginning. In order to minimize this risk, the consent form will outline the main aims of study. Therefore, participants will be aware of the subject matter of the questions prior to commencing. Additionally, a debrief form will contain information relating to the study and also will advise participants to contact their GP for a referral should they be experiencing distress. The nature of the study offers minimal risk in relation to the participants physical or psychological well-being as the design is quantitative in nature and not exploring the participants' well- being in depth via interviews. In addition, there will be no financial compensation for engaging in the study.

Participants will be told that they have the right to withdraw from this study at any time, under no obligation. Participants will also be made aware that there is no right or wrong answer; it is just looking at their own experiences during their injury. It is not a measure of their intelligence.

Consent forms will be distributed to the each participant in both the print based version and also online, this will clearly describe the aims of the study and highlighting that they are under no obligation to complete the questionnaires and have the right to withdraw at any time. Whilst the data is anonymous, it will be stated in the consent and debrief from, that the participant can email the researcher, quoting the individual questionnaire number or responses to the demographic questionnaire, to request that their responses are withdrawn from the study. It will also be stated in the consent form that the any such request will need to be made within three weeks of completing the questionnaires. This is in order for the researcher to be aware of when data analysis and interpretation can begin. The researcher will keep a record of the consent forms and these will be stored securely.

Given the nature of the study, it is deemed unlikely that the participants will want to seek additional advice. Participants will receive a debrief form which will provide a contact details for the principle researcher. It will also highlight that the participants should contact their GP for referral should they have felt distressed when completing the questionnaires. There will also be contact details of counseling services as part of the debrief form.

In the unlikely event that a participant does seek additional advice, the participants will be able to use the contact details of the principle researcher enclosed in the debrief form. The researcher will exercise particular caution when responding such requests from research participants concerning psychological or other issues, and would recommend they contact their GP for a referral.

The aims of the study will be disclosed in the consent form and therefore participants who may not feel comfortable to disclose information about their injury and recovery will be aware in advance and may not elect to complete the questionnaire.

Participants will receive a debrief form which will thank them for their participation and highlight the aims of the study. The debrief form will also contain the contact details (email address) of the principle researcher. The form will also have a statement relating to the participant to contact their GPs for referral should they have felt psychological distress after completing the question. It will also provide contact details to counseling organizations. As no deception is being carried out it is believed to be unlikely that the participants will wish to be debriefed further. However, in the unlikely occasion that the participant is harmed by answering the questions the participants will be within their right to contact the researcher. The researcher will exercise particular caution when responding to research participants concerning psychological or other issues of distress, and would recommend they contact their GP for a referral.

The researcher will take particular care when discussing outcomes with research participants, as seemingly evaluative statements may carry unintended weight.

Student's signature _____ Date *10/11/2010*

(Supervisor signature required prior to submission)

I have checked this form and believe that the student has supplied the necessary information

Supervisor's signature _____

---------- Forwarded message ----------
From: **John B (HASS)** <bjohn1@glam.ac.uk>
Date: 10 December 2010 10:53
Subject: RE: Ethics - Questionnaire
To: Stuart Jones <99019337@glam.ac.uk>
Cc: "Roderique-Davies G (HASS)" <gdavie10@glam.ac.uk>, Stuart Jones <stuartanthonyjones@hotmail.com>

Hi Stuart

You're fine to proceed with the study.

cheers

Bev

Dr Bev John CPsychol AFBPsS

Head of Research & Reader in Psychology

Division of Psychology

Faculty of Humanities & Social Sciences

University of Glamorgan / Prifysgol Morgannwg

Pontypridd

CF37 1DL

Tel / Ffon: 01443 654145

bjohn1@glam.ac.uk

www.glam.ac.uk

SCHOOL OF PSYCHOLOGY ETHICS APPROVAL FORM

Name: Stuart Jones

Project/Research Title: A confirmatory factor analysis on the Emotional Responses in Athletic Injury in Recreational Rugby Union Scale, and an exploration into the relationship between social support, perceived injury severity and the emotional responses following injury in recreational Rugby Union players.

SUMMARY OF PLANNED RESEARCH

Indicate the purpose of your planned project/research, your aims, main research question and research design.

Appendix 4 Ethics form and Response Study 4

Participating in physical activity involves the risk of injury. In 1996, sport and exercise was the leading source injury in the United Kingdom, accounting for approximately thirty three percent of all injuries (Uitenbroak, 1996; cited in Johnson, 2007). Lewin's (1991) epidemiological study found that injury risk for elite football players in the United Kingdom during one season was 91%.

Participants in high contact or collision sports are at an increased risk to injury occurrence than those who partake in non-contact sports. Hillman (2000) noted that athletes who participate in high contact activities, in which Rugby Union would be categorised, have a higher risk for potential fatalities and severe orthopaedic injuries in comparison to non-contact sports. High contact sports also have a greater potential risk for catastrophic head and neck injuries. In a review that explored the neurological assessments for amateur level athletes, Broshek and Barth (2001) reported that Rugby has the third highest incidence rate with regards to concussive injuries. In a list that compared the rate of concussive injuries in different sports, they noted that equestrian sports has the highest incidence of concussive injuries, this is followed by Boxing, Rugby, Association Football and American Football (Broshek and Barth, 2001). Hackfort and Kleinert (2007) reported that in Germany up to one million injuries are registered every year, costing approximately one billion euros in medical treatment. It can be postulated that the likelihood of becoming injured while engaging in sports, resulting in a disruption of participation, is statistically high (Johnson, 2007).

Such figures, in addition to the statistics relating to non-adherence to medical treatment and physiotherapy (see Evans et al, 2006 for a review of this literature) has led to an increased research from psychologists in to the emotional responses following injury in an attempt to establish a link between the emotional responses following injury and adherence to treatment (Arvinen-Barrow et al, 2010). However, a critique of previous research was noted by Evans et al (2010) who highlighted a lack of specific measures that explore the emotional responses following injury. In the main researchers have relied on measures such as the Profile of Mood States (McNair, 1969) that was not developed using injured athletes and therefore researchers, such as Evans et al (2010) have questioned the validity of sports injury research using this tool.

As this has been considered a priority in sport injury research (Johnson, 2007) and also to address the issue of a lack of research exploring the emotional responses in recreational level athletes, the overriding aim of this researchers PhD study is to develop a measure that has been specifically designed and with initial validation on a specific group of injured athletes, that is recreational rugby players. At an earlier stage of the researcher's development an exploratory factor analysis was been carried out on Emotional Responses to Rugby Union Injury Inventory (see attached scale). This was developed through a numerous previous studies, as part of the PhD journey, using a variety of methods and approved by the University of Glamorgan Ethics Panel.

This follow up study will provide a Confirmatory Factor Analysis of the Inventory designed. The second purpose of this study is to explore the relationship between social support, perceived injury severity and the emotional responses following injury in recreational level rugby players. Following an extensive literature research there appears to be no research looking at the impact of social support on perceived injury severity and the emotional responses, despite a relationship being hypothesized in Wiese-Bjornstal et al's (1998) integrated responses to sports injury model. This aspect will also assist in examining the predictive validity of developed scale. Social Support will be measured using the Social Support Inventory for Injured Athletes (Mitchell et al, 2008) and perceived injury severity will be measured through using part of Taylor and May's (1996) inventory that measures perceived injury severity. It is hypothesized that strong social support mechanisms will have a buffering impact on both perceived injury severity and the emotional responses following injury. Specifically, those obtaining high levels of social support will report greater frequency of positive emotions and lower perceived injury severity. In additions, for those participants who are receiving little social support, their emotional responses following injury will be largely dependent on their perceptions of the injury severity.

This study is entirely quantitative in design; the CFA of the Emotional Responses to Rugby Union Injury Inventory will be analyzed using EQS. The exploration into the relationship between social support, perceived injury severity and the emotional responses following injury will be measured using a hierarchical regression analysis.

METHODOLOGY

Give a detailed account of the methodology you propose to use including instruments and procedure.

Instruments

The study is entirely quantitative in design, each participant will complete three inventories - the Emotional Responses to Rugby Union Injury Inventory which has been developed as part of this ongoing PhD (see attached questionnaire). This is a 56 item inventory exploring 7 factors on a likert scale

Mitchell et al (2008) Social Support Inventory for Injured Athletes (see attached) which is the first inventory that was developed, and initially psychometrically validated (e.g. Rees et al, 2010) specifically using injured athletes will be used to measure Social Support levels. This is a 16 item inventory, measuring 4 factors of social support.

The athlete's perceived injury severity scale will be measured using the "perceived injury severity" aspect of Taylor and May's (1996) inventory (see attached) that assessed the protection motivation theory in sports injury. This scale has been used extensively in the sports injury literature and has been psychometrically tested (see Evans et al, 2006 for a review). This is 5 item scale measured on a likert scale measuring perceived injury severity

A demographic questionnaire will also be used (see attached) to assess if the participants fit the specific criteria for the study in terms of athletic ability level and injury (see participants section).

Procedure

According to Harrington (2008) and Schur (2001) it is recommended that a large sample size to conduct a CFA should exceed 200 or have a ratio of 5 participants per item measured. Therefore a sample size of a minimum of 230 injured recreational rugby players need to be obtained.

To fit the criteria of the study, participants must be a recreational level rugby player and also currently injured in which they have been unable to participate for a minimum of two consecutive weeks or training or match games as a result of the injury (Tracey, 2003). Participants will be obtained via two main methods.

1) Sample from patients currently seeking medical support from chartered physiotherapists (both NHS and private) or sports injury therapists.
2) Online survey using surveymonkey.

Prior to completing the 3 measures, participants will complete a demographic questionnaire concerning the nature of their injury and their sports level participation. Participants who do not meet the criteria in terms of time sports participation missed or athletic ability level will be omitted from the data analysis.

Participants would then complete the three measures; the emotional responses following injury, perceived social support and perceived injury severity.

CFA data of the Emotional Responses to Rugby Union Injury Inventory would be analyzed using EQS. The Hierarchical analysis of the three measures would analyzed using SPSS.

PARTICIPANTS

My participants are:	Give details of participants in this box (selection; recruitment etc).
☐ Early years/Pre-School children ☐ School age children ☐ Young people aged 17-18 ☐ Vulnerable people ☒ Adults ☐ Unknown at this stage	Selection of participants is based on Tracey (2003) study in which only currently injured participants who have been unable to participate for a minimum of two consecutive weeks or training or match games as a result of the injury will be included in the study. Participants must also fit the criteria of the previous research as part of the PhD of being of recreational level rugby players. This information will be obtained in completing the demographic questionnaire (see attached document). A sample size of 5 participants per every question has been recommended to sufficiently conduct a CFA on a measure (Schur, 2001). This is classified as a large sample size by Harrington (2008). Therefore a minimum of 230 participants will be needed to conduct the study. Whilst this is a large number, the research has many links in the sports injury field and the previous study as part of the PhD process managed to access 580 participants fitting the same criteria. Participants will recruited via two main methods. 1) Sample from patients currently seeking medical support from chartered physiotherapists (both NHS and private) or sports injury therapists. 2) Online survey using surveymonkey.

CRIMINAL RECORDS CLEARANCE

Do you have Criminal Records Bureau clearance? Tick the relevant boxes.

☐ Yes, I have attached a copy of my CRB clearance certificate

☒ No, not applicable

☐ I have applied for a CRB certificate*	Application date: Click here to enter text.

**You must submit a copy of your CRB clearance certificate to the ethics panel before you commence data collection.*

ETHICAL ISSUES

Consider each of the ethical issues below. Details of the 'Code of Human Research Ethics' and the 'Code of Ethics and Conduct' are available on the course Blackboard site or from www.bps.org.uk). You should read both these documents before completing this aspect of the form. Failure to address all of these issues fully may result in ethical consent being declined.

Risk: There is a minimal risk as the participants as this study involves no deception. The researcher is aware that as participants are being asked about the perceived severity of their injuries, this could be potentially distressing for some participants and could lead to them experiencing a significantly more negative mood by the end of the study compared to at the beginning. In order to minimize this risk, the consent form will outline the main aims of study. Therefore, participants will be aware of the subject matter of the questions prior to commencing. Additionally, a debrief form will contain information relating to the study and also will advise participants to contact their GP for a referral should they be experiencing distress. The nature of the study offer minimal risk in relation to the participants physical or psychological well being as the design is quantitative in nature and not exploring the participants well being in depth via interviews. In addition, there will be no financial compensation for engaging in the study.

Participants will be told that they have the right to withdraw from this study at any time, under no obligation. Please see Valid Consent section for more details.

Participants will also be made aware that there is no right or wrong answer; it is just looking at their own experiences during their injury. It is not a measure of their intelligence.

Valid consent: Consent forms will be distributed to the each participant in both the print based version and also online, this will clearly describe the aims of the study and highlighting that they are under no obligation to complete the questionnaires and have the right to withdraw at any time. Whilst the data is anonymous, it will be stated in the consent and debrief from, that the participant can email the researcher, quoting the individual questionnaire number or responses to the demographic questionnaire, to request that their responses are withdrawn from the study. It will also be stated in the consent form that the any such request will need to be made within three weeks of completing the questionnaires. This is in order for the researcher to be aware of when data analysis and interpretation can begin.

The researcher will also keep adequate records of the consent forms and when they were obtained

Confidentiality: Whilst the participants will fill in a demographic questionnaire, they do not disclose their name or address in any section of the questionnaire. They will be required to sign a consent form which may disclose a name. However, this consent form will be stored securely by the principle research in a key locked cabinet. Upon completing the data analysis, this information will be shredded. All information imputed for analysis will be imputed on a password protected computer (only the principle research will know the password); upon data analysis this information will be deleted. Any personal information that they do wish to declare to the researcher will be confidential. As this is a quantitative design, no specific information relating to an individual participant will be disclosed in the report or to anyone.

Giving advice: Given the nature of the study, it is deemed unlikely that the participants will want to seek additional advice. Participants will receive a debrief form which will provide a contact details for the principle researcher. It will also highlight that the participants should contact their GP for referral should they have felt distressed when completing the questionnaires. There will also be contact details of counseling services as part of the debrief form.

In the unlikely event that a participant does seek additional advice, the participants will be able to use the contact details of the principle researcher enclosed in the debrief form. The researcher will exercise particular caution when responding such requests from research participants concerning psychological or other issues, and would recommend they contact their GP for a referral.

The aims of the study will be disclosed in the consent form and therefore participants who may not feel comfortable to disclose information about their injury and recovery will be aware in advance and may not elect to complete the questionnaire.

Deception: No deception is being carried out.

Debriefing - Participants will receive a debrief form which will thank them for their participation and highlight the aims of the study. The debrief form will also contain the contact details (email address) of the principle researcher. The form will also have a statement relating to the participant to contact their GPs for referral should they have felt psychological distress after completing the question. It will also provide contact details to counseling organizations. As no deception is being carried out it is believed to be unlikely that the participants will wish to be debriefed further. However, in the unlikely occasion that the participant is harmed by answering the questions the participants will be within their right to contact the researcher. The researcher will exercise particular caution when responding to research participants concerning psychological or other issues of distress, and would recommend they contact their GP for a referral.

The researcher will take particular care when discussing outcomes with research participants, as seemingly evaluative statements may carry unintended weight.

DECLARATION

Student: I have checked this form and believe that all the necessary information has been given	
Type Name: STUART ANTHONYJONES	Date: 18th December 2012.
TO BE COMPLETED BY ETHICS PANEL	
CRB confirmation received? ☐ Yes ☐ No* *Ethics approval withheld if CRB certificate is necessary but a copy is not included ☐ Not necessary ☐ Awaiting certificate	
Recommendations: ☐ Approved ☐ Declined ☐ Conditionally approved* * subject to changes requested below	
Changes requested: Click here to enter text.	
Name: Click here to enter text.	Date: Click here to enter text.

School of Psychology

UNIVERSITY OF • PRIFYSGOL Glamorgan Morgannwg

CARDIFF • PONTYPRIDD • CAERDYDD

ETHICS AND PROFESSIONAL PRACTISE PANEL

Date: 17/12/13
Ref: SOP12-004
Title: A confirmatory factor analysis on the Emotional Responses in Athletic Injury in Recreational Rugby Union Scale, and an exploration into the relationship between social support, perceived injury severity and the emotional responses following injury in recreational Rugby Union players

Dear Stuart,

Further to the above application for approval from the School Ethics and Professional Practise Panel, the outcome was:

Conditionally Approved*.

Yours Sincerely,

Gareth Roderique-Davies
(Chair of the Ethics and Professional Practise Panel)

****Additional Information**

The condition attached to approval is that the specific points (below) received by the panel are discussed with your supervisory team. You should change your ethics proposal form to reflect these points and re-submit it to the ethics panel for the record. The proposal will not need to be reconsidered by the panel though and the research can commence as soon as the supervisors are satisfied that the points have been adequately addressed.

Specific Feedback from panel members:

PANEL MEMBER 1

1) The student identifies no risk as a result of this study. This seems to be based on the idea that there is no deception. However, even though the scales are structured, participants receiving treatment for injuries are still being asked about the perceived severity of their injuries. This could be potentially distressing for some participants and could lead to them experiencing a significantly more negative mood by the end of the study compared to at the beginning. How do the consent, debrief and support information minimise the risk of this possibility? I would be happier to see an account of how this risk were going to be managed that makes it clear participants will leave the study in the same (or improved) psychological state as they entered it.

2) Anonymity of questionnaire materials is identified as the main method of ensuring confidentiality. However presumably there will be a signed consent form and/or email trail where participants are given the link to survey monkey? How will such data be securely stored, for how long and how will it be disposed of?

3) The student appears unclear about the boundaries of his professional competency when it comes to "giving advice". I would like to see a much clearer articulation of the circumstances under which Stuart is able to advise and those under which he will be referring. For example, of course it would be appropriate for Stuart to discuss the aims, methods and theoretical basis of his research with an interested participant. However it would be inappropriate for him to provide any sort of counselling. I do not know whether he holds such a qualification; however as the researcher, he is an "interested party" and would therefore not be appropriate even if he does. This section definitely needs more work.

PANEL MEMBER 2

This is a questionnaire study and I cannot see any physical or psychological risks, beyond the participants developing an awareness that they are more affected by their injuries than they realised before taking part in the study. For this reason, I think the information relating to what happens to the participants after taking part and how withdrawal after data is collected is managed needs to be tightened up.

He says people can withdraw at any time – does this include after contributing data, and after analysis? This should be confirmed, along with a description of how he will manage withdrawal at a later date.

He said no debriefing will be offered unless he deems that the participant has been harmed. All participants should receive at least a written debriefing outlining the purpose, aims etc., of the research and giving the contact details of the researcher, supervisors and potential sources of help and support.

How would he be deciding on whether harm has occurred? Will he actually be arranging counselling himself for the individuals? I'm not sure that is appropriate – perhaps he should ask them to contact their GPs for referrals, unless he has the necessary experience and contacts to make appropriate referrals...

Participant Information Sheet

Thank you for expressing an interest to be involved in this research study. Before you decide to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information and to decide whether to take part or not. The study will also contribute to my thesis for a PhD qualification at the University of Glamorgan.

What is the purpose of the study?

My research aims to explore the emotional responses following injury in recreational rugby players. Recreational rugby players may be clarified in this study as players who do not play rugby at a professional level. Much existing research has focused on professional and international rugby players, whereas this study is focusing on recreational rugby players. I am expecting that the conclusions will inform the academic and healthcare fields on the psychological impact that injury can have on non-professional athletes.

To take part in the study I am looking for individuals who are currently unable to participate in Rugby training / matches due to injury, I would like to interview you about your experiences of your injury. I am hoping to recruit about 10 other injured non-professional rugby players for this research.

Do I have to take part?

Taking part in this research is entirely voluntary and you do not have to take part. If you do agree to take part you may keep the information sheet and you will be asked to sign a consent form. You are free to withdraw at any time without giving reason. If you decide to withdraw any information collected will be destroyed

What will happen to me if I agree to take part?

Each participant will be expected to take part in three in-depth interviews to talk about their experiences since their injury. Each interview is expected to take between 60-90 minutes although there are no defined limits. I would like to interview you at three different times during your injury, early, mid and when close to recovery. If you consent to be interviewed I will contact you to agree a convenient time and place. The interview questions will be lightly structured to allow you to talk freely and openly. I assure you that your taking part in this study will remain strictly confidential.

How will the data (interviews) be stored?

In line with the 1998 Data Protection Act, all interview data will be stored confidentially and securely. A Dictaphone will be used to aid transcription and the data codified and stored securely on a password protected personal computer. Any information that may make it possible to identify you or any other individual will be omitted from the transcript. As participants you have the right to view the transcribed interviews. Any data transferred to academic colleagues will be coded. Data from the Dictaphone will be deleted once information is transcribed. It is expected that extracts of the interview transcript text will be used in both my thesis and in any publications resulting from this thesis, but steps will be taken to ensure the anonymity of you and any other individuals or any organisation.

Participants' Rights

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed. You have the right to omit or refuse to answer or respond to any question that is asked of you

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

Benefits and Risks

Participation in this study involves 3 interviews in which you will discuss your experiences relating your injury. You may find discussing your injury distressing and it is important to note that the researcher is not trained in counselling. It is not possible for the researcher to offer a counselling service if distress is experienced, you may want to discuss any emotional distress with an appropriate health professional. The researcher will be able to offer you contact details of professional counsellors if required.

Cost, Reimbursement and Compensation

There are no expenses or payments for taking part in this research

How do I get involved in the study?

If you have suffered an injury which is preventing you playing or training and you would like to be involved in the study please contact myself (Stuart Jones) my contact details are below.

For further information

I, Stuart Jones, the researcher will be glad to answer your questions about this study at any time. You may contact me at 07974021227 or email 99019337@glam.ac.uk If you wish to speak to my Director of Studies about any aspect of this study you can email Dr Gareth Roderique-Davies on gdavie10@glam.ac.uk

Participant Information Sheet

Thank you for expressing an interest to be involved in this research study. Before you decide to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information and to decide whether to take part or not. The study will also contribute to my thesis for a PhD qualification at the University of Glamorgan.

What is the purpose of the study?

My research aims to explore the physiotherapists perceptions of the emotional responses that recreational rugby players experience following injury. Recreational rugby players may be clarified in this study as players who do not play rugby at a professional level. Much existing research has focused on professional and international rugby players, whereas this study is focusing on recreational rugby players. I am expecting that the conclusions will inform the academic and healthcare fields on the psychological impact that injury can have on non-professional athletes.

To take part in the study I am looking for qualified physiotherapists, working in the NHS and private sector, who have experience in sports injury rehabilitation to take part in two focus group sessions. I would like to the focus group to discuss your experiences of the emotional responses that recreational rugby players can face and the impact that these emotional responses can have on rehabilitation outcome. I am hoping to recruit about 10 qualified physiotherapists to participate in the focus group.

Do I have to take part?

Taking part in this research is entirely voluntary and you do not have to take part. If you do agree to take part you may keep the information sheet and you will be asked to sign a consent form. You are free to withdraw at any time without giving reason. If you decide to withdraw any information collected will be destroyed

What will happen to me if I agree to take part?

Each participant will be expected to take part in two in-depth focus group discussions alongside other physiotherapists to talk about your experiences of the emotional responses that recreational rugby players can face and the impact that these emotional responses can have on rehabilitation outcome. Each focus group is expected to take between 60-90 minutes although there are no defined limits. If you consent to be part of the focus group I will contact each participant to arrange the most convenient time. The focus group questions will be lightly structured to allow you to talk freely and openly. I assure you that your taking part in this study will remain strictly confidential.

How will the data (interviews) be stored?

In line with the 1998 Data Protection Act, all data will be stored confidentially and securely. A Dictaphone will be used to aid transcription and the data codified and stored securely on a password protected personal computer. Any information that may make it possible to identify you or any other individual will be omitted from the transcript. As participants you have the right to view the transcribed interviews. Any data transferred to academic colleagues will be coded. Data from the Dictaphone will be deleted once information is transcribed. It is expected that extracts of the interview transcript text will be used in both my thesis and in any publications resulting from this thesis, but steps will be taken to ensure the anonymity of you and any other individuals or any organisation.

Participants' Rights

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed. You have the right to omit or refuse to answer or respond to any question that is asked of you

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

Benefits and Risks

Participation in this study involves two focus group discussions in which you will discuss your experiences of the emotional responses that recreational rugby players can face following injury and the impact that these emotional responses can have on rehabilitation outcome. You may find discussing your injury distressing and it is important to note that the researcher is not trained in counselling. It is not possible for the researcher to offer a counselling service if distress is experienced, you may want to discuss any emotional distress with an appropriate health professional. The researcher will be able to offer you contact details of professional counsellors if required.

Cost, Reimbursement and Compensation

There are no expenses or payments for taking part in this research

How do I get involved in the study?

If would like to be involved in the study please contact myself (Stuart Jones) my contact details are below.

For further information

I, Stuart Jones, the researcher will be glad to answer your questions about this study at any time. You may contact me at 07974021227 or email 99019337@glam.ac.uk If you wish to speak to my director of studies about any aspect of this study you can email Dr Gareth Roderique-Davies on gdavie10@glam.ac.uk

Participant Information Sheet

Thank you for expressing an interest in this research study. Before you decide to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information and to decide whether to take part or not. The study will also contribute to my thesis for a PhD qualification at the University of Glamorgan.

What is the purpose of the study?

My research aims to explore the feelings experienced following injury in recreational rugby players. Recreational rugby players may be clarified in this study as players who do not play rugby at a professional level. Much existing research has focused on professional and international rugby players, whereas this study is focusing on recreational rugby players. I am expecting that the conclusions will inform the academic and healthcare fields on the psychological impact that injury can have on non-professional athletes.

To take part in the study I am looking for individuals who are currently unable to participate in Rugby training / matches due to injury, to complete a total of two questionnaires.

Do I have to take part?

Taking part in this research is entirely voluntary and you do not have to take part. If you do agree to take part you may keep the information sheet and you will be asked to sign a consent form. You are free to withdraw at any time without giving reason. If you decide to withdraw any information collected will be destroyed

What will happen to me if I agree to take part?

Each participant will be expected to complete two questionnaires. The first of these questionnaires will ask you questions about your sports participation, the nature of your current injury and about your history of previous injuries. The aim of the second questionnaire is to look at how you have felt since your current injury. You will be asked to respond to a variety of statements and using the 1-5 likert scale you are asked to circle how often you have experienced these feelings since your injury. Further instructions are written above each questionnaire. It is expected to take between 15-20 minutes to complete both questionnaires. There is no right or wrong answers and I am looking for your own personal experiences. I assure you that your taking part in this study will remain strictly confidential.

How will the data be stored?

In line with the 1998 Data Protection Act, all data will be stored confidentially and securely. Data from the questionnaire will be coded securely on a password protected computer and any information that may make it possible to identify you or any other individual will be omitted from any coded information. Only those involved in the research can have access to the raw data (questionnaires).

Participants' Rights

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed. You have the right to omit or refuse to answer or respond to any question that is asked of you.

Whilst the data is anonymous, you can email myself (Stuart Jones), quoting the individual questionnaire number, to request that your responses are withdrawn from the study. However, any such request will need to be made within three weeks of completing the questionnaires. This is in order for the researcher to be aware of when data analysis and interpretation can begin.

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

Benefits and Risks

Participation in this study involves answering two questionnaires in which you will discuss your experiences relating your injury. You may find discussing your injury distressing and it is important to note that the researcher is not trained in counselling. It is not possible for the researcher to offer a counselling service if distress is experienced, you may want to discuss any emotional distress with an appropriate health professional.

Cost, Reimbursement and Compensation

There are no expenses or payments for taking part in this research

How do I get involved in the study?

If you are suffering from an injury which is preventing you playing or training and you would like to be involved, providing you are over 18 and have signed the consent form, the questionnaires can be distributed immediately.

For further information

I, Stuart Jones, the researcher will be glad to answer your questions about this study at any time. You may contact me at 07974021227 or email 99019337@glam.ac.uk If you wish to speak to my director of studies about any aspect of this study you can email Dr Gareth Roderique-Davies on gdavie10@glam.ac.uk

Participant Information Sheet

Thank you for expressing an interest to be involved in this research study. Before you decide to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information and to decide whether to take part or not. The study will also contribute to my thesis for a PhD qualification at the University of Glamorgan.

What is the purpose of the study?

My research aims to explore the feelings experienced following injury in recreational rugby players. Recreational rugby players may be clarified in this study as players who do not play rugby at a professional level. Much existing research has focused on professional and international rugby players, whereas this study is focusing on recreational rugby players. I am expecting that the conclusions will inform the academic and healthcare fields on the psychological impact that injury can have on non-professional athletes.

To take part in the study I am looking for individuals who are currently unable to participate in Rugby training / matches due to injury, to complete a total of four questionnaires.

Do I have to take part?

Taking part in this research is entirely voluntary and you do not have to take part. If you do agree to take part you may keep the information sheet and you will be asked to sign a consent form. You are free to withdraw at any time without giving reason. If you decide to withdraw any information collected will be destroyed

What will happen to me if I agree to take part?

Each participant will be expected to complete four questionnaires. The first of these questionnaires will ask you questions about your sports participation, the nature of your current injury and about your history of previous injuries. The aim of the second questionnaire is to look at you have felt since your current injury. You will be asked to respond to a variety of statements and using the 1-5 likert scale you are asked to circle how often you have experienced these feelings since your injury. The third questionnaire refers to your perceptions of the severity of your current injury. The fourth questionnaire refers to the types of help and support you might get from others during your injury. For this questionnaire you will be responding to a variety of statements using the 1-5 likert scale to indicate what extent the statement relates to your current experience whilst injured. You will again be asked the extent to which you agree with the statements using the 1-5 Likert scale. Further instructions are written above each questionnaire. It is expected to take between 20-25 minutes to complete all the questionnaires. Please complete them in the order presented. There is no right or wrong answers and I am looking for your own personal experiences. I assure you that your taking part in this study will remain strictly confidential.

How will the data be stored?

In line with the 1998 Data Protection Act, all data will be stored confidentially and securely. Data from the questionnaire will be coded securely on a password protected computer and any information that may make it possible to identify you or any other individual will be omitted from any coded information. Only those involved in the research can have access to the raw data (questionnaires).

Participants' Rights

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed. You have the right to omit or refuse to answer or respond to any question that is asked of you.

Whilst the data is anonymous, you can email myself (Stuart Jones), quoting the individual questionnaire number, to request that their responses are withdrawn from the study. However, any such request will need to be made within three weeks of completing the questionnaires. This is in order for the researcher to be aware of when data analysis and interpretation can begin.

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

Benefits and Risks

Participation in this study involves answering four questionnaires in which you will discuss your experiences relating your injury. You may find discussing your injury distressing and it is important to note that the researcher is not trained in counselling. It is not possible for the researcher to offer a counselling service if distress is experienced, you may want to discuss any emotional distress with an appropriate health professional.

Cost, Reimbursement and Compensation

There are no expenses or payments for taking part in this research

How do I get involved in the study?

If you are suffering from an injury which is preventing you playing or training and you would like to be involved, providing you are over 18 and have signed the consent form, the questionnaires can be distributed immediately.

For further information

I, Stuart Jones, the researcher will be glad to answer your questions about this study at any time. You may contact me at 07974021227 or email 99019337@glam.ac.uk If you wish to speak to my director of studies about any aspect of this study you can email Dr Gareth Roderique-Davies on gdavie10@glam.ac.uk

Participant Consent Form
Emotional responses following injury in recreational rugby players: A qualitative study.

Researcher – Stuart Jones

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected

3. I understand that relevant sections of the data collected during the study may be looked at by my director of studies and other academics involved in my PhD, where this is relevant to my taking part in this research. I give permission for these individuals to have access to this data

4. I consent to the use of Dictaphone during the interview, with the possible use of verbatim quotations. I am aware of my rights to view the transcribed interviews. I also understand that the Dictaphone recording will be destroyed after transcription.

5. I agree to take part in this study.

Participant

Name.....Signature.....Date.....

Researcher.....Signature.....Date.....

Participant Consent Form
Physiotherapists Perceptions of the Emotional Responses Experienced by Injured Recreational Rugby Players: A Focus Group Study.

Researcher – Stuart Jones

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected

3. I understand that relevant sections of the data collected during the study may be looked at by my director of studies and other academics involved in my PhD, where this is relevant to my taking part in this research. I give permission for these individuals to have access to this data

4. I consent to the use of Dictaphone during the focus group, with the possible use of verbatim quotations. I am aware of my rights to view the transcribed material and your right to have any data that you have supplied at that point to be destroyed. I also understand that the Dictaphone recording will be destroyed after transcription.

5. I agree to take part in this study.

Participant

Name.....Signature.....Date.....

Researcher.....Signature.....Date.....

Participant Consent Form
An exploratory factor analysis of the Emotional Responses in Athletic Injury in Recreational Rugby Union Scale

Researcher – Stuart Jones

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected

3. I understand that relevant sections of the data collected during the study may be looked at by my director of studies and other academics involved in my PhD, where this is relevant to my taking part in this research. I give permission for these individuals to have access to this data

4. I am aware of my rights as a participant as stated in the information sheet and also the benefits and potential risks in participating in this study, as stated in the information sheet. I am aware that I must contact the researcher within three weeks of completing the questionnaires should I wish to withdraw my data from the study.

5. I agree to take part in this study.

Participant

Name.....Signature.....Date.....

Researcher.....Signature.....Date.....

Participant Consent Form

An Exploration into the Relationship between Social Support, Perceived Injury Severity and the Emotional Responses following Injury in Recreational Rugby Union players

Researcher – Stuart Jones

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected

3. I understand that relevant sections of the data collected during the study may be looked at by my director of studies and other academics involved in my PhD, where this is relevant to my taking part in this research. I give permission for these individuals to have access to this data

4. I am aware of my rights as a participant as stated in the information sheet and also the benefits and potential risks in participating in this study, as stated in the information sheet. I am aware that I must contact the researcher within three weeks of completing the questionnaires should I wish to withdraw my data from the study.

5. I agree to take part in this study.

Participant

Name.....Signature.....Date.....

Researcher.....Signature.....Date.....

Debriefing

Emotional responses following injury in recreational rugby players: A qualitative study

This study was an investigation into the emotional responses following injury in recreational rugby players. According to the International Rugby Board (IRB, 2008) there are 79,800 registered and non registered Rugby players in Wales alone. The vast majority of these players will not be playing Rugby professionally and will be playing the sport at a recreational level. Rugby is regarded as one of the most physical of contact team sports with injuries occurring frequently. Existing research has focused on the impact that injuries can have both physically and psychologically on professional level athletes, but there has been very little existing research that has looked at its impact on those who play sport at a more recreational level. As part of my PhD research at the University of Glamorgan, I want to see the emotional impact that injuries can have on recreational level rugby players.

By conducting three interviews with you at different stages of your injury and recovery I can get an idea of the emotional responses you experienced during the injury process and how this might have changed across the different stages. Your honest responses to the questions during the interview are valuable to look at how the emotional response following injury might change over time and whether aspects such as previous injuries and the support you have received might have an effect on your emotional responses.

As this was an interview study in which your own lived and personal experiences are critical I do not make any predictions with what I expect to find. The information that you have provided will be part of several interviews with recreational rugby players who are currently injured. There is no right or wrong answers to the interviews; I was looking for your own personal experience

Your generosity and willingness to participate in this study has been greatly appreciated. Your input will help contribute to the advancement of the field of the Psychology of Sports Injury Research. Sometimes people find discussing their injury in such detail distressing. If you have felt distressed and would like to speak to someone about your thoughts, please contact the researcher who can offer you contact details of appropriate support services: Please be aware of your rights as a participant as noted in the participant information sheet, all data from the recorded interviews will be transcribed in a way to maintain anonymity and confidentiality. You have the right to view the transcripts and you have the right to withdraw from the study without explanation. Additionally, you have the right to ask that any data that you have supplied to that point be withdrawn/destroyed.

Information will be stored in line with the 1998 Data Protection Act. Any data transferred to academic colleagues will be coded. Data from the Dictaphone will be deleted once information is transcribed. It is expected that extracts of the interview transcript text will be used in both my thesis and in any publications resulting from this thesis, but steps will be taken to ensure the anonymity of you and any other individuals or any organisation

Please contact the researcher Stuart Jones at the following e-mail address 99019337@glam.ac.uk or telephone 07974021227 if you have any questions regarding this study.

THANK YOU AGAIN FOR YOUR CO-OPERATION

Debriefing

Physiotherapists Perceptions of the Emotional Responses Experienced by Injured Recreational Rugby Players: A Focus Group Study.

This study was an investigation into Physiotherapists perceptions of the emotional responses that recreational rugby players experience following injury. According to the International Rugby Board (IRB, 2008) there are 79,800 registered and non registered Rugby players in Wales alone. The vast majority of these players will not be playing Rugby professionally and will be playing the sport at a recreational level. Rugby is regarded as one of the most physical of contact team sports with injuries occurring frequently. Existing research has focused on the impact that injuries can have both physically and psychologically on professional level athletes, but there has been very little existing research that has looked at physiotherapists perceptions of the emotional responses experienced by injured recreational rugby players. With your experience in the rehabilitation of sports injuries you have a unique position in treating a vast amount of recreational rugby players and can offer an important insight into the types of emotions injured recreational rugby players experience and its impact on their rehabilitation. As part of my PhD research at the University of Glamorgan, I want to hear from a physiotherapist's point of view the emotional impact that injuries can have on recreational level rugby players.

By conducting two focus groups with qualified physiotherapists who have vast experience of dealing with injured recreational rugby players, I can get an idea of the emotional responses that recreational rugby players experience during the injury process. Additionally, the focus group sessions discussed the relationship between emotional responses and rehabilitation adherence and aspects that might influence the emotional responses. Your honest responses to the questions during the focus group are valuable to look at how the emotional response following injury might change over time and whether aspects such as previous injury experience and the support received might have an effect on recreational rugby players' emotional responses following injury.

As this is a focus group study in which your own personal experiences are critical I do not make any predictions with what I expect to find. There is no right or wrong answers to the questions discussed in the focus group; I was looking for your own personal experience

Your generosity and willingness to participate in this study has been greatly appreciated. Your input will help contribute to the advancement of the field of the Psychology of Sports Injury Research. Sometimes people find discussing their perceptions of other people's emotional responses in such detail distressing. If you have felt distressed and would like to speak to someone about your thoughts, please contact the researcher who can offer you contact details of appropriate support services: Please be aware of your rights as a participant as noted in the participant information sheet, all data from the recorded focus groups will be transcribed in a

way to maintain anonymity and confidentiality. You have the right to view the transcripts and have the right to withdraw from the study without explanation. You have the right to ask that any data that you have supplied to that point be withdrawn/destroyed.

Information will be stored in line with the 1998 Data Protection Act. Any data transferred to academic colleagues will be coded. Data from the Dictaphone will be deleted once information is transcribed. It is expected that extracts of the focus group transcripts text will be used in both my thesis and in any publications resulting from this thesis, but steps will be taken to ensure the anonymity of you and any other individuals or any organisation.

Please contact the researcher Stuart Jones at the following e-mail address 99019337@glam.ac.uk or telephone 07974021227 if you have any questions regarding this study.

THANK YOU AGAIN FOR YOUR CO-OPERATION

Debriefing

An exploratory factor analysis of the Emotional Responses in Athletic Injury in Recreational Rugby Union Scale

This study was an investigation into the emotional responses following injury in recreational rugby players. According to the International Rugby Board (IRB, 2008) there are 79,800 registered and non registered Rugby players in Wales alone. The vast majority of these players will not be playing Rugby professionally and will be playing the sport at a recreational level. Rugby is regarded as one of the most physical of contact team sports with injuries occurring frequently. Existing research has focused on the impact that injuries can have both physically and psychologically on professional level athletes, but there has been very little existing research that has looked at its impact on those who play sport at a more recreational level. As part of my PhD research at the University of Glamorgan, I want to see the emotional impact that injuries can have on recreational level rugby players.

In this study you were required to answer two questionnaires, the first of these provided me with information about the level of which you play rugby and also the nature of your current injury. The second scale is aimed to assess your emotional responses following injury. This scale has been developed by as part of my PhD research, following previous interview based research of injured athletes and a comprehensive research of existing literature. Your responses will form part of a large study which will analyse the validity and applicability of this scale. Existing studies have highlighted the impact that a person's emotions following injury can have on their behaviour. However, this is the first scale designed to measure recreational rugby players' emotional responses following injury.

As this is an exploratory study assessing the validity of the scale I do not make any predictions with what I expect to find. The information that you have provided will be part of a very large study with recreational rugby players who are currently injured who will also complete the scale. There is no right or wrong answers to the completing the scale; I was looking for your own personal experience

Your generosity and willingness to participate in this study has been greatly appreciated. Your input will help contribute to the advancement of the field of the Psychology of Sports Injury Research. Sometimes people find discussing their injury in such detail distressing. If you have felt distressed and would like to speak to someone about your thoughts, please contact the researcher who can offer you contact details of appropriate support services: Please be aware of your rights as a participant as noted in the participant information sheet, all data will be stored confidentially and securely. You have the right to withdraw from the study without explanation and have the right to ask that any data that you have supplied to that point be withdrawn/destroyed.

Whilst the data is anonymous, you can email myself (Stuart Jones), quoting the individual questionnaire number, to request that your responses are withdrawn from the study. However, any such request will need to be made within three weeks of completing the questionnaires. This is in order for me to be aware of when data analysis and interpretation can begin

Information will be stored in line with the 1998 Data Protection Act. All data will be stored confidentially and securely. Data from the questionnaire will be coded securely on a password protected computer and any information that may make it possible to identify you or any other individual will be omitted from any coded information. Only those involved in the research can have access to the raw data (questionnaires).

Please contact the researcher Stuart Jones at the following e-mail address 99019337@glam.ac.uk or telephone 07974021227 if you have any questions regarding this study.

THANK YOU AGAIN FOR YOUR CO-OPERATION

Debriefing

A confirmatory factor analysis on the Emotional Responses in Athletic Injury in Recreational Rugby Union Scale, and an exploration into the relationship between social support, perceived injury severity and the emotional responses following injury in recreational Rugby Union players

This study was an investigation into the emotional responses following injury in recreational rugby players. According to the International Rugby Board (IRB, 2008) there are 79,800 registered and non registered Rugby players in Wales alone. The vast majority of these players will not be playing Rugby professionally and will be playing the sport at a recreational level. Rugby is regarded as one of the most physical of contact team sports with injuries occurring frequently. Existing research has focused on the impact that injuries can have both physically and psychologically on professional level athletes, but there has been very little existing research that has looked at its impact on those who play sport at a more recreational level. As part of my PhD research at the University of Glamorgan, I want to see the emotional impact that injuries can have on recreational level rugby players and whether social support and perceived injury severity can affect the emotional responses experienced.

In this study you were required to answer four questionnaires, the first of these provided me with information about the level of which you play rugby and also the nature of your current injury. The second scale is aimed to assess your emotional responses following injury. This scale has been developed by as part of my PhD research, following previous interview based research of injured athletes and a comprehensive research of existing literature. Your responses will form part of a large study which will analyse the validity and applicability of this scale. Existing studies have highlighted the impact that a person's emotions following injury can have on their behaviour. However, this is the first scale designed to measure recreational rugby players' emotional responses following injury. The information that you have provided will be part of a very large study with recreational rugby players who are currently injured who will also complete the scale. There is no right or wrong answers to the completing the scale; I was looking for your own personal experience

The third scale measures your perceptions of perceived injury severity and the fourth scale measures the type of help and support you have received during your injury process.

Whilst this is the first study of its kind to examine the emotional responses following injury in recreational rugby players, previous interview based research and existing literature in professional level athletes leads me to anticipate that there will be a relationship between levels of social support and the emotional responses following injury. Namely that people who have received high levels of social support will experience less fear, confusion, stress, anger and greater levels of positive emotions than those athletes who have not received high levels of social support. Similarly, it is predicted that those who perceive that their injury is severe will experience greater

levels of anger, fear, confusion, stress, low feelings, and lower levels of positive emotions than those who do not consider their injury is severe.

Your generosity and willingness to participate in this study has been greatly appreciated. Your input will help contribute to the advancement of the field of the Psychology of Sports Injury Research. Sometimes people find discussing their injury in such detail distressing. If you have felt distressed and would like to speak to someone about your thoughts, please contact the researcher who can offer you contact details of appropriate support services: Please be aware of your rights as a participant as noted in the participant information sheet, all data will be stored confidentially and securely. You have the right to withdraw from the study without explanation and have the right to ask that any data that you have supplied to that point be withdrawn/destroyed.

Whilst the data is anonymous, you can email myself (Stuart Jones), quoting the individual questionnaire number, to request that your responses are withdrawn from the study. However, any such request will need to be made within three weeks of completing the questionnaires. This is in order for me to be aware of when data analysis and interpretation can begin

Information will be stored in line with the 1998 Data Protection Act. All data will be stored confidentially and securely. Data from the questionnaire will be coded securely on a password protected computer and any information that may make it possible to identify you or any other individual will be omitted from any coded information. Only those involved in the research can have access to the raw data (questionnaires).

Please contact the researcher Stuart Jones at the following e-mail address 99019337@glam.ac.uk or telephone 07974021227 if you have any questions regarding this study.

THANK YOU AGAIN FOR YOUR CO-OPERATION

Appendix 17 Interview Schedule Study 1 – First Interviews (Early Onset)

Interview Schedule – Early Phase.

A: Initial Reaction to Injury.

1. Can you tell me what about the injury you have suffered?
2. Can you describe how the injury took place, in your own words?
3. When did you realise you suffered an injury?
4. Could you describe your initial reaction after you suffered the injury? Why?
5. What about the pain? Can you describe it?
6. Tell me about your feelings immediately following the injury?
    - Prompt: What was going through your mind?
7. Tell me about your physical response immediately following the injury?
    - Prompt: What did you do?
8. Can you tell me about your thoughts about being injured?
9. Did you try and self-diagnose the injury? Why?
10. Can you tell me about your thoughts relating to the severity of the injury when it first happened? Why was this?

B. History of Injury.

11. Tell me about any previous injury you have suffered;
12. Has your previous injury experience influenced the way you responded to this injury?
    - Can you describe how and why this is?
13. Have you experienced any similar sensations to this?
14. Can you tell me about situations in which you have reacted the same way?
15. How would you define your injury in terms of severity? Why?

C. Consequences of the Injury.

16. Tell me about how the Injury has affected your everyday life;

17. Do you know how long you will be unable to participate in Rugby because of the injury?

    - How does this make you feel?

18. How would you describe yourself as a person?

    - Prompt: What sort of person are you, most important characteristics.

19. Has having the injury and starting treatment made a difference to how you see yourself?

    - Prompt: How do you see yourself now as different? How would you say you have changed?

20. What are your feelings as you are facing weeks of rehabilitation?

21. Would you change any thing that you have done with regards to after the injury?

    - Prompt: Do you have any regrets?

D. Social Support.

22. Tell me about the reaction of your team mates immediately as you suffered the injury;

    - Prompt: When did someone notice you were injured?

23. How did their reaction make you feel?

24. Did you consider the reaction of your team mates to be a positive or a negative? Why?

25. If you had to describe what the support of team mates means to you, what would you say?

    - Prompt: What words come to mind, what images.

26. If you had to describe how the support of team mates has influenced your adherence to rehabilitation, what would you say?

27. What about the opposition players? Did they react to the injury, tell me about their reaction?

28. How did their reaction make you feel?

29. When did the coach first realise you were injured?

30. Do you feel the coach could have done any more with regards to your injury?

    - Prompt: Could the coach have reacted any quicker?

31. If you had to describe what the support of the coach means to you, what would you say?

    - Prompt: What words come to mind, what images?

32. If you had to describe how the support of your coach has influenced your adherence to rehabilitation, what would you say?

33. What about other onlookers (e.g. Crowd). How did they react to your injury?

    - How did this make you feel?

34. Tell me about the support being provided by friends and family;

35. If you had to describe what the support of friends and family means to you, what would you say?

    - Prompt: What words come to mind, what images?

36. If you had to describe how the support of friends and family has influenced your adherence to rehabilitation, what would you say?

E. Rehabiliation Adherence.

37. Have you seeked any medical attention for your injury? If so, can you describe the medical attention you have had.

38. Can you tell me why did you seek medical treatment?

    - Prompt: What were your reasons to seek treatment?

39. Can you describe your initial opinion of the physiotherapist/medical practitioner who you have been dealing with?

    - Prompt: Views of the physio;

40. Has the relationship with the physiotherapist assisted your adherence to the therapy? How?

41. Tell me about the type of rehabilitation programme you are going through;

42. Can you describe your feelings about the rehabilitation programme?

43. Tell me about the time (if any) that you haven't felt so motivated to do the treatment; Why is this?

44. Can you tell me about the feelings you have felt over the course of the rehabilitation so far?

45. Tell me what these feelings mean to you

46. Do you know how long the treatment will last / How long it will be before you are able to play rugby?

49. How does this make you feel?

50. Tell me about the things that influence what you think about your injury?

51. Would there be any things you would do differently since you've had your injury.

- Prompt: Any regrets.

52. Can you tell me about the factors that has facilitated your adherence to the treatment so far.

53. Can you tell me about any barriers to your adherence so far?

54. Do you think much about the future?

Appendix 18 Interview Schedule Study 1 – Second Interviews (Mid Phase)

Interview Schedule – Mid Phase.

A. Injury.

1. Can you describe to me how the injury has been since I last spoke to you?
2. Can you describe to me how you have been rehabilitating the injury since I last spoke to you?
3. Can you tell me the affect the injury has had on your everyday life?
4. Can you tell me about your feelings since I last spoke to you? Why?
5. Can you tell me about the pain? Describe to me what has been like since I last spoke to you?
6. Can you describe how the pain has made you feel since we last spoke?
    - Prompt: What's been going through your mind?
7. Can you tell me your thoughts with regards to the severity of the injury? How do you define a severe injury?
8. On a day to day basis how do you deal with your injury?

B. Feelings.

9. Can you tell me about the feelings you have been going through since we last spoke? Why is this?
10. Can you tell me the things that trigger a negative / positive response? Why?
11. Have you experienced anything similar to this?
12. Can you tell me what your feelings mean to you about the injury?
13. How do you view yourself as a person now?
14. Tell me about how other people view you?
15. Do you think your feelings have affected other parts of your life?

C. History of Injury.

16. Has your previous injury experience influence the way you responded to this injury?
    - Can you describe how and why this is?
17. Have you experienced any similar sensations to this?
18. Have there been any situations in which you have reacted the same way?

D. Consequences of the Injury.

19. Tell me about how the Injury has affected your everyday life.
20. Have you thought much about the rugby since we spoke?
    - How does this make you feel?
21. Has having the injury and starting treatment made a difference to how you see yourself?
    - Prompt: How do you see yourself now as different? How would you say you have changed?
22. Would you change anyway thing that you have done with regards to after the injury?
    - Prompt: Do you have any regrets?

E. Social Support.

23. Tell me about the support of your friends and family since we spoke, can you describe what they have been like?
24. How did their reaction make you feel?
25. Can you tell me if you feel their support has been beneficial or not? Why?
26. If you had to describe what the support of friends and family means to you, what would you say?
    - Prompt: What words come to mind, what images?
27. If you had to describe how the support of friends and family has influenced your adherence to rehabilitation, what would you say?

28. Can you tell me if anyone from within your Rugby team have been in contact with you since we last spoke? Who?

29. How has this made you feel?

30. Can you describe to me the contact you have made with players/coaching staff of the club since we last spoke?

31. Can you describe your opinions on how the people at the club have reacted to your injury?

32. How has their reaction made you feel?

33. Describe to me how the reaction of the members of the club has influenced your rehabilitation?

34. Has there been any other person who has provided some support to injury? How has this made you feel?

35. If I was to ask the support of which person has been most beneficial to your adherence to the treatment, who would you say?

36. Why was this?

37. How do you feel people see you since your injury? Is this any different to before?

38. If you could change any social support being given since we spoke last, what you do?

F. Rehabiliation Adherence.

39. Can you describe the medical attention you have had since we last spoke?

40. Can you describe your relationship with your physiotherapist?

- Prompt: Views of the physio,

41. Tell me your thoughts about the impact of the physiotherapists in your recovery?

42. Tell me about the type of rehabilitation programme you are going through;

43. Can you describe your feelings about the rehabilitation programme?

44. Tell me about the time (if any) that you haven't felt so motivated to do the treatment; Why is this?

45. How have you felt over the course of the rehabilitation so far? Why has this?

46. What are your feelings about still being unable to participate in Rugby?

- Prompt: Aspects that you've missed

47. Has thoughts of returning to rugby been a factor in your rehabilitation adherence?

48. Can you tell me about the factors that have enhanced your adherence to the rehabilitation?

49. Can you tell me about the times you've found it hard to maintain your motivation?

50. Can you tell me how you feel when you are performing your rehabilitation exercise?

51. Can you tell me about the barriers to your adherence to the rehabilitation?

52. How would you define adherence to rehabilitation?

53. On a scale of 1-10 (with 10 being high), how would you rate your adherence to the rehabilitation overall? Why is this?

54. Can you tell me about the times when it wasn't so high? What factors made it not so high? How were you feeling?

55. Would there be any things you would do differently since you've had your injury?

- Prompt: Any regrets?

56. How much do you think about your injury?

57. Do you think much about the future?

Appendix 19 Interview Schedule Study 1 – Third Interviews (Near Recovery)

Interview Schedule – End Phase.

A. Injury.

1. Can you describe to me how the injury has been since I last spoke to you?
2. Can you describe to me how you have been rehabilitating the injury since I last spoke to you?
3. Can you tell me the affect the injury has had on your everyday life?
4. Can you tell me about how you have been feeling since I last spoke to you? Why?
5. Can you tell me about the pain? Describe to me what has been like since I last spoke to you?
6. What cause through your mind when you think about the pain levels?
    - Prompt: Tell me about the pain levels
7. Can you tell me your thoughts with regards to the severity of the injury at this stage?
8. On a day to day basis how have you been dealing with the injury since we last spoke?
9. Can you describe to me your feelings about returning to Rugby?
10. Can you tell me about any fears you have?

B. Feelings / Responses.

11. Can you tell me about you feelings have been going through since we last spoke? Why is this?
12. Has there been anything that has made you feel happy or sad?
13. Have you experienced anything similar to this?
14. Can you tell me what do your thoughts and feelings about the injury mean to you now?
15. How do you view yourself as a person now?
16. Can you tell me the about the effect that your reaction to your injury has had on other people?

C. History of Injury.

17. Has your previous injury experience influence the way you responded to this injury?
    - Can you describe how and why this is?
18. Have you experienced any similar sensations to this?
19. Have there been any situations in which you have reacted the same way?

D. Consequences of the Injury.

20. Tell me about how the Injury has affected your everyday life.
21. Have you thought much about the rugby since we spoke?
    - How does this make you feel?
22. Has having the injury and starting treatment made a difference to how you see yourself?
    - Prompt: How do you see yourself now as different? How would you say you have changed?
23. Would you change anyway thing that you have done with regards to after the injury?
    - Prompt: Do you have any regrets?
26. Can you tell me about any fears you are experiencing?

E. Social Support.

27. Tell me about the support of your friends and family since we spoke, can you describe what they have been like?
28. How did their reaction make you feel?
29. Can you tell me if you feel their support has been beneficial or not? Why?
30. If you had to describe what the support of friends and family means to you, what would you say?

- Prompt: What words come to mind, what images?

31. Tell me about how friends and family have made you feel since the last time we spoke?

32. Is there any person that has had the biggest impression on your feelings since your injury?

33. How has this made you feel?

34. Can you describe to me the contact you have made with players/coaching staff of the club since we last spoke?

35. How has their reaction made you feel?

36. Describe to me how the reaction of the members of the club has influenced your rehabilitation?

37. How do you feel people see you since your injury? Is this any different to before?

38. If you could change any social support being given since we spoke last, what you do?

39. As you are facing the end of your rehabilitation can you give me an overall assessment of the support you have received?

F. Rehabiliation Adherence.

40. Can you describe the medical attention you have had since we last spoke?

41. Can you describe your relationship with your physiotherapist? Has there been a time since we last spoke where your view were not as they are now?

- Prompt: Views of the physio;

42. Do you feel that relationship with the physiotherapist assisted your adherence to the therapy? How?

43. Tell me about the type of rehabilitation programme you are going through;

44. Can you describe your feelings about the rehabilitation programme?

45. Tell me about what the rehabilitation has meant to you

46. How have you felt over the course of the rehabilitation so far? Why has this?

47. What factors do you feel have affected your adherence to the treatment?

48. What are your feelings about still being unable to participate in Rugby?

49. Tell me about what aspects of non-participation in Rugby make you feel low?

- Prompt: Aspects that you've missed

50. Has thoughts of returning to rugby been a factor in your rehabilitation adherence?

- Prompt: Getting close to return.

51. Can you tell me about the factors that have enhanced your adherence to the rehabilitation?

52. Can you tell me about the times you've found it hard to maintain your motivation?

53. Can you tell me how you feel when you are performing your rehabilitation exercise?

54. Can you tell me about the barriers to your adherence to the rehabilitation?

55. How would you define adherence to rehabilitation?

56. On a scale of 1-10 (with 10 being high), how would you rate your adherence to the rehabilitation overall? Why is this?

57. Can you tell me about the times when it wasn't so high? What factors made it not so high? How were you feeling?

58. Can you describe your feelings about getting back to full health? Has this been positive or negative?

59. Would there be any things you would do differently since you've had your injury?

- Prompt: Any regrets?

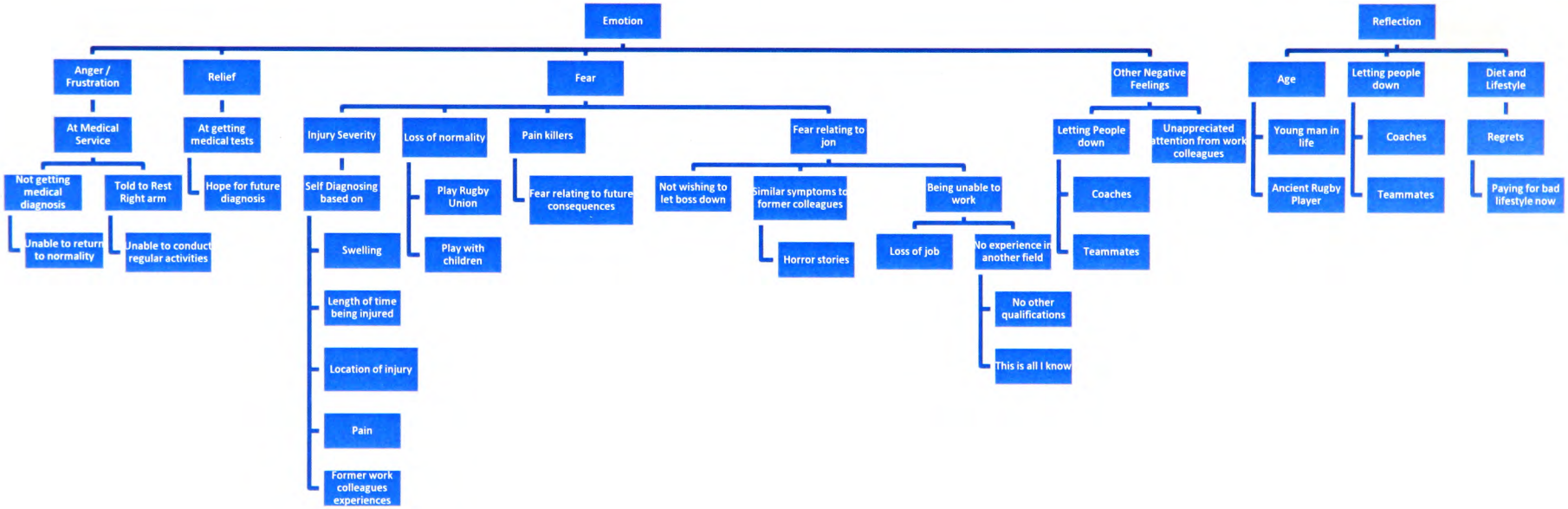
60. How much do you think about your injury?

61. You are now approaching the end of your rehabilitation? How does this make you feel?

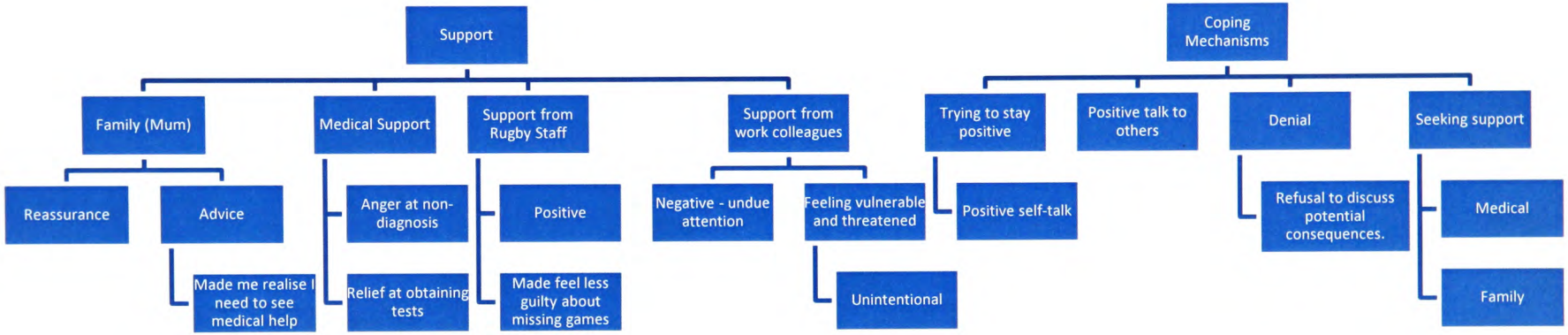
62. How would you view your adherence as time as progressed?

63. Do you think much about the future?

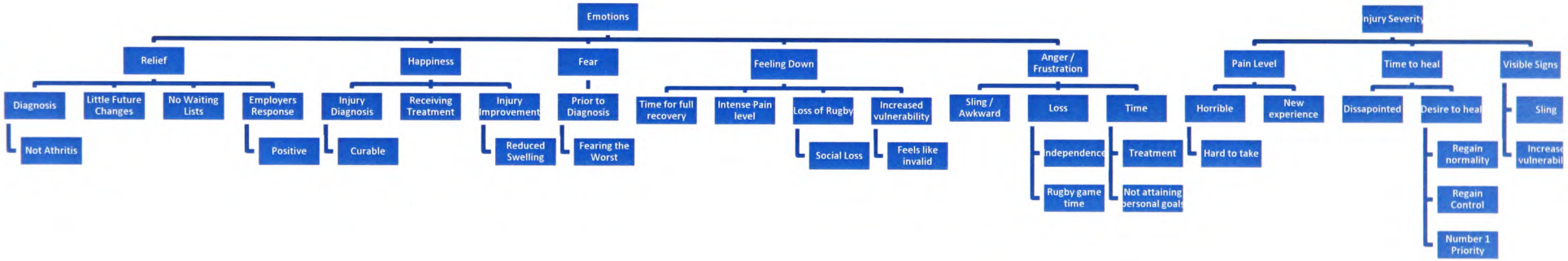
Diagrammatical Thematic Map for Jimmy at the onset of injury (Interview 1).



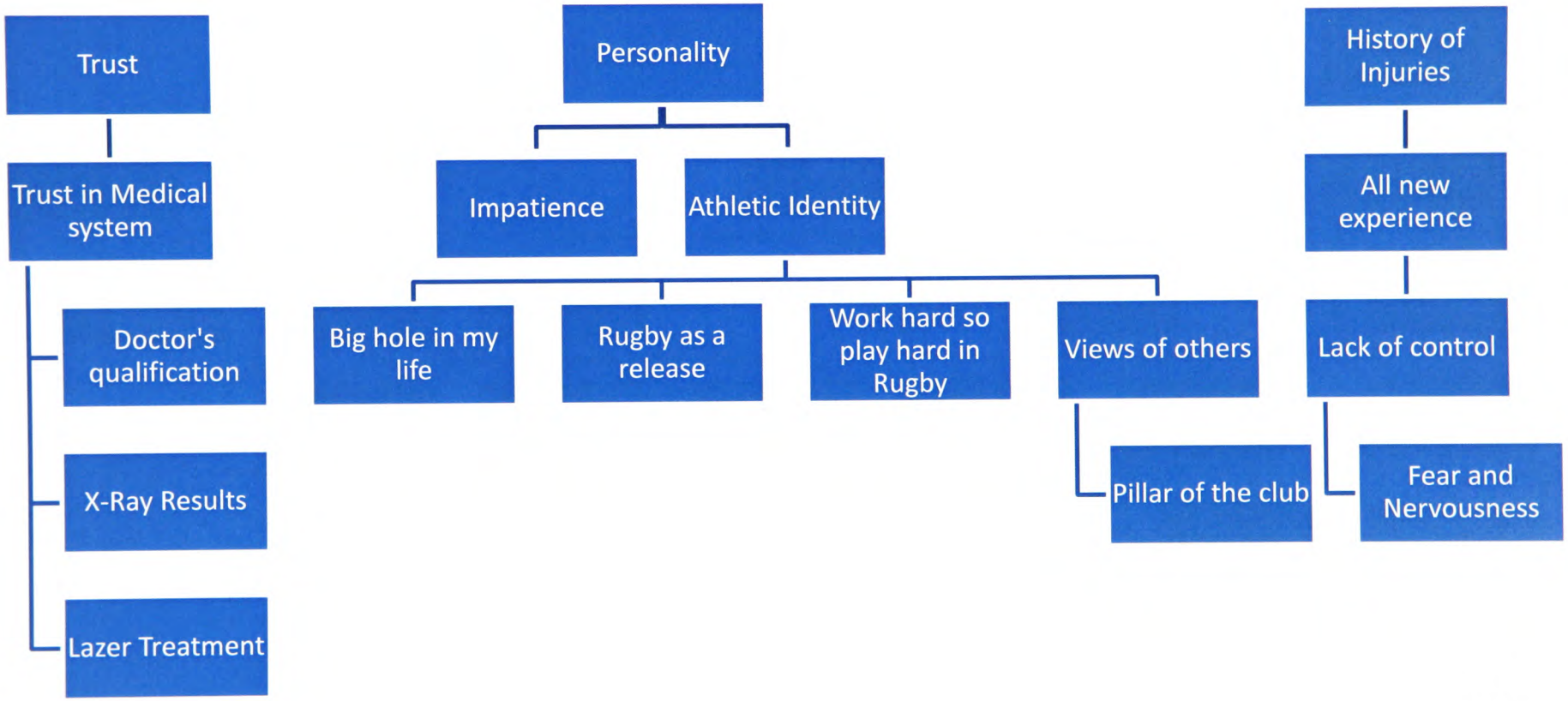
Diagrammatical Thematic Map for Jimmy at the onset of injury (Interview 1 – Continued).



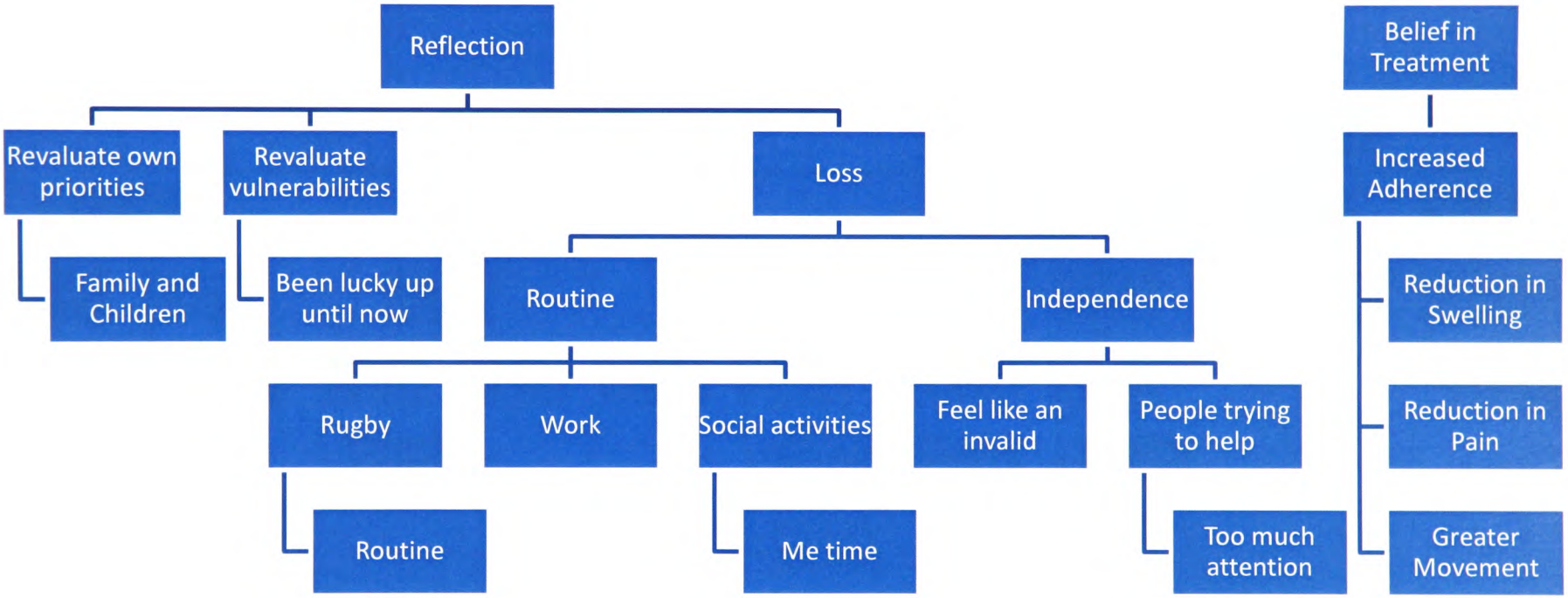
Diagrammatical Thematic Map for Jimmy during the mid-phase (Interview 2).



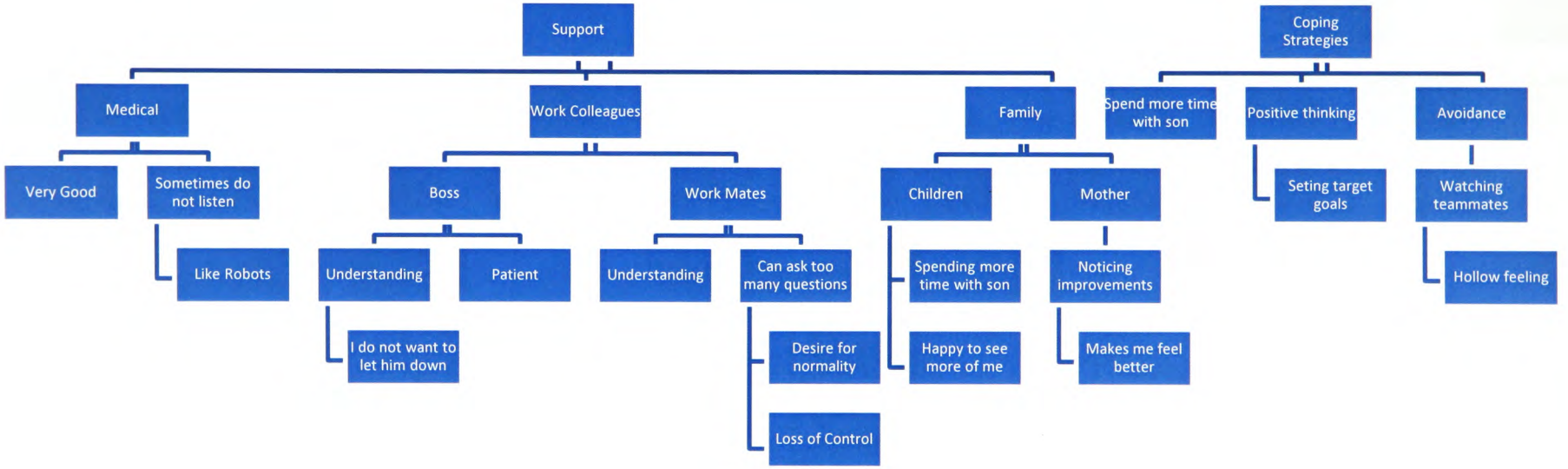
Diagrammatical Thematic Map for Jimmy during the mid-phase (Interview 2 - continued).



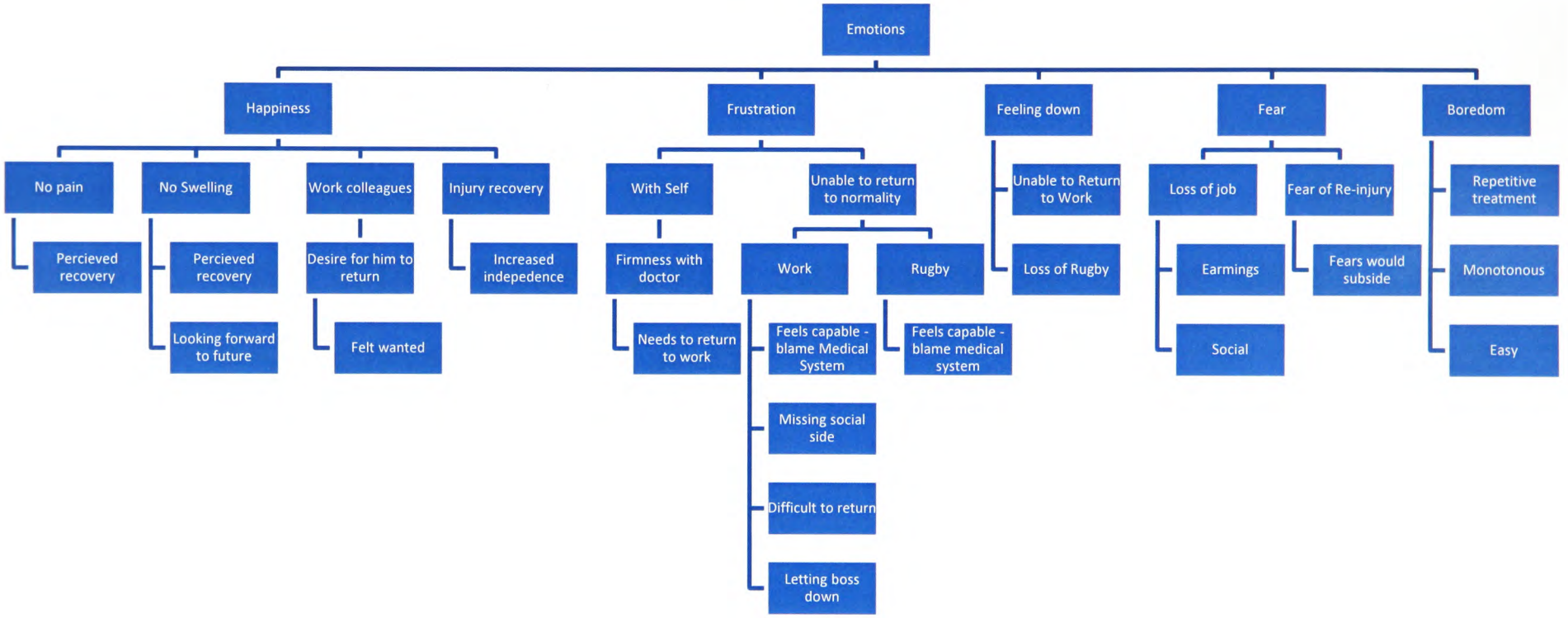
Diagrammatical Thematic Map for Jimmy during the mid-phase (Interview 2 - continued).



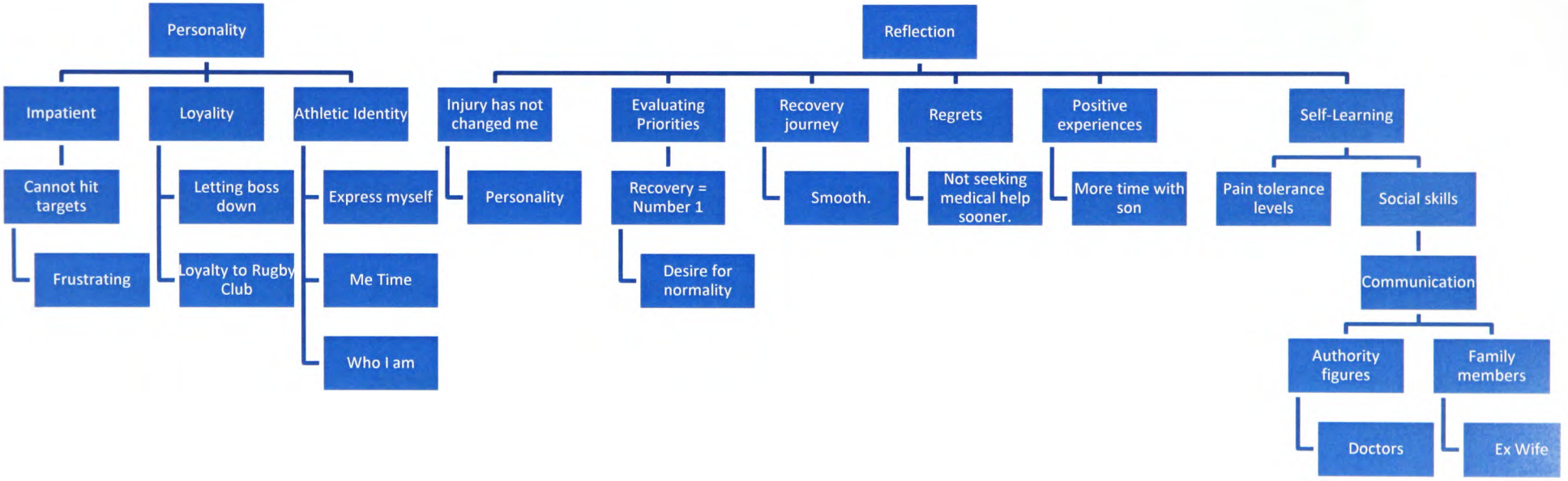
Diagrammatical Thematic Map for Jimmy during the mid-phase (Interview 2 - continued).



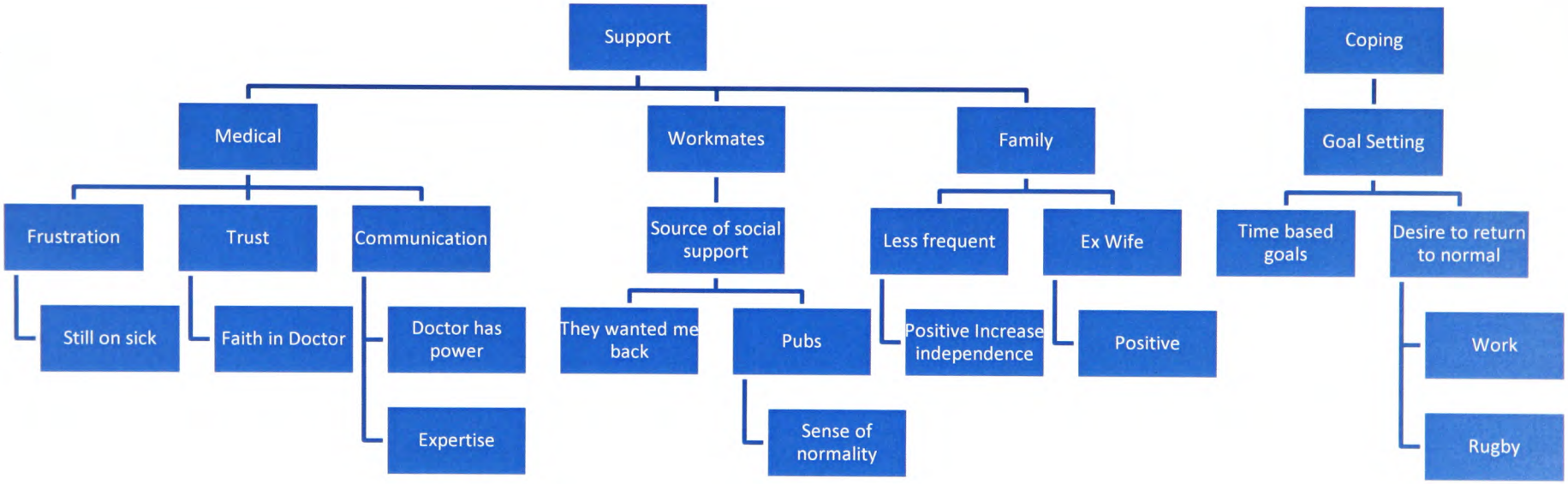
Diagrammatical Thematic Map for Jimmy during the end-phase (Interview 3).



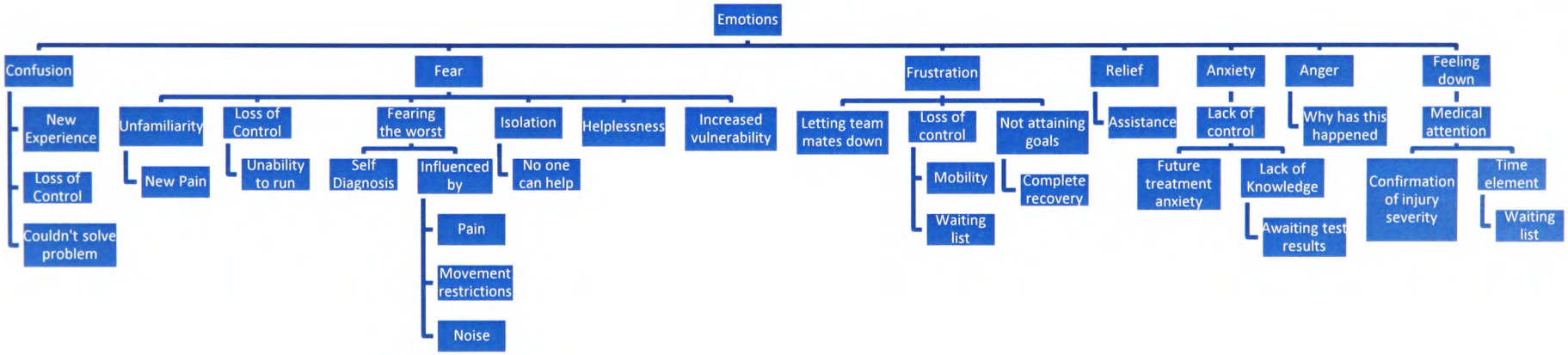
Diagrammatical Thematic Map for Jimmy during the end-phase (Interview 3 - continued).



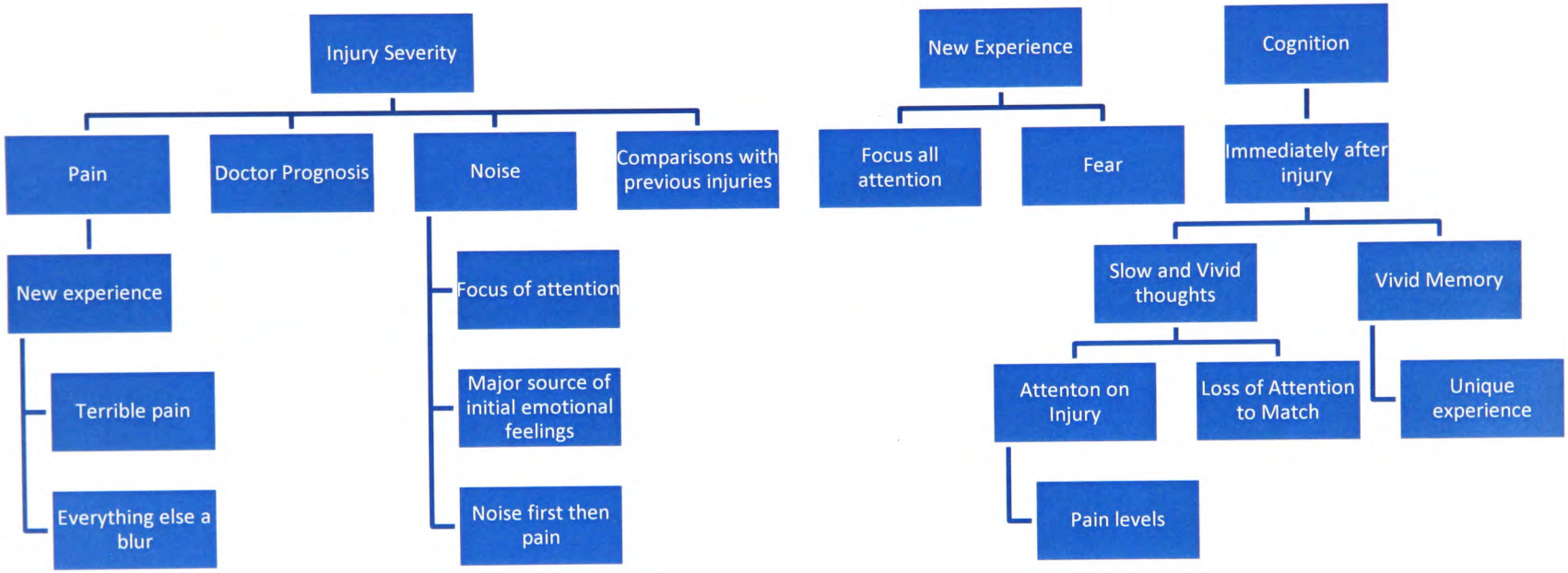
Diagrammatical Thematic Map for Jimmy during the end-phase (Interview 3 - continued).



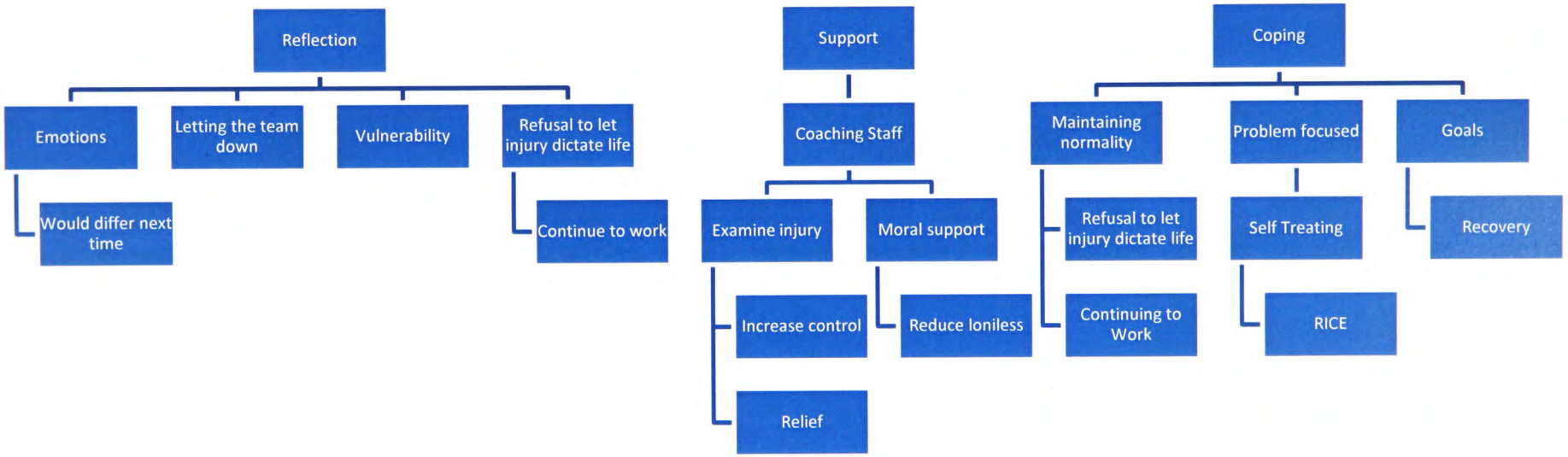
Diagrammatical Thematic Map for Phillip at the onset of injury (Interview 1)



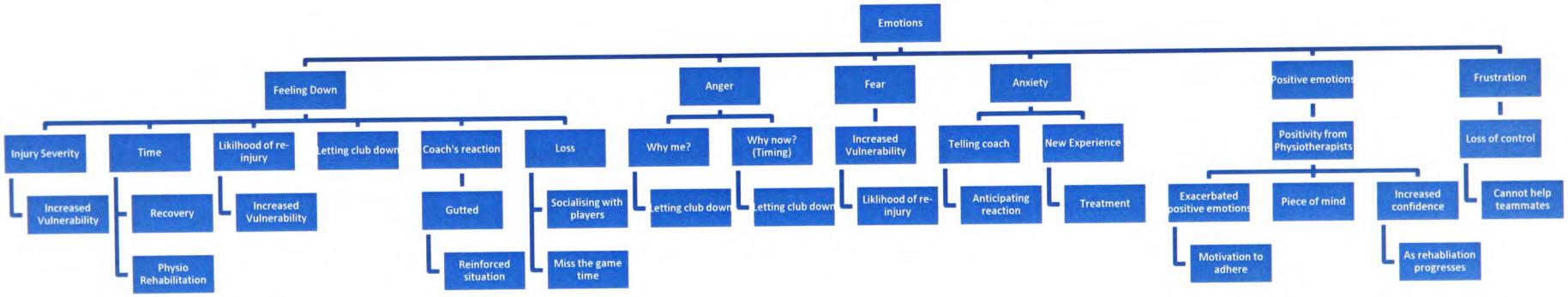
Diagrammatical Thematic Map for Phillip at the onset of injury
(Interview 1 - continued)



Diagrammatical Thematic Map for Phillip at the onset of injury (Interview 1 – Continued).

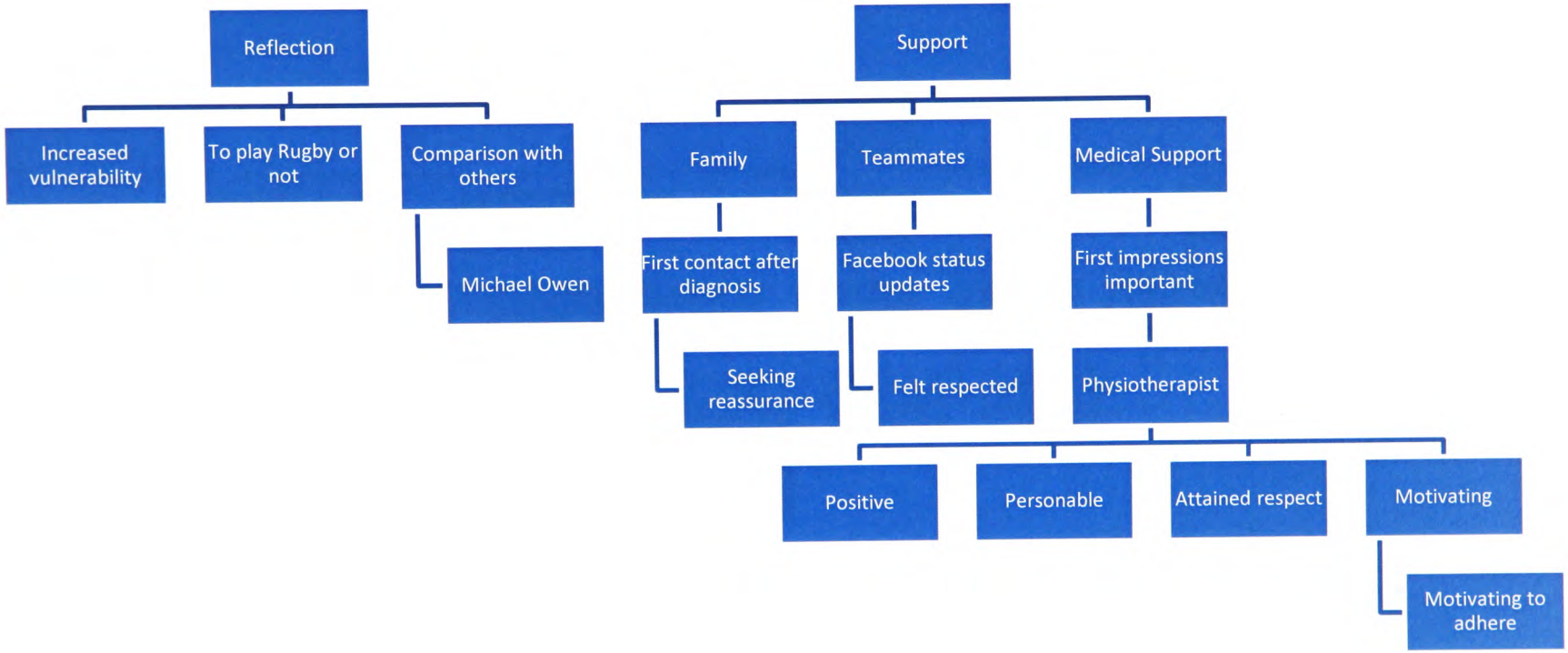


Diagrammatical Thematic Map for Phillip during the mid-phase (Interview 2).

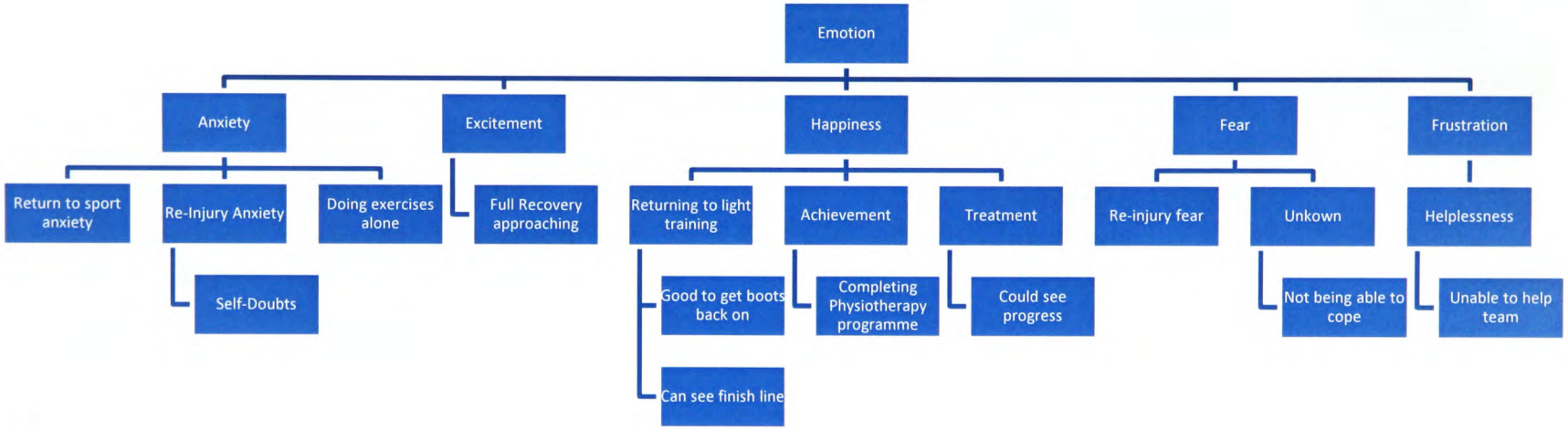


Diagrammatical Thematic Map for Phillip during the mid-phase (Interview 2- continued).

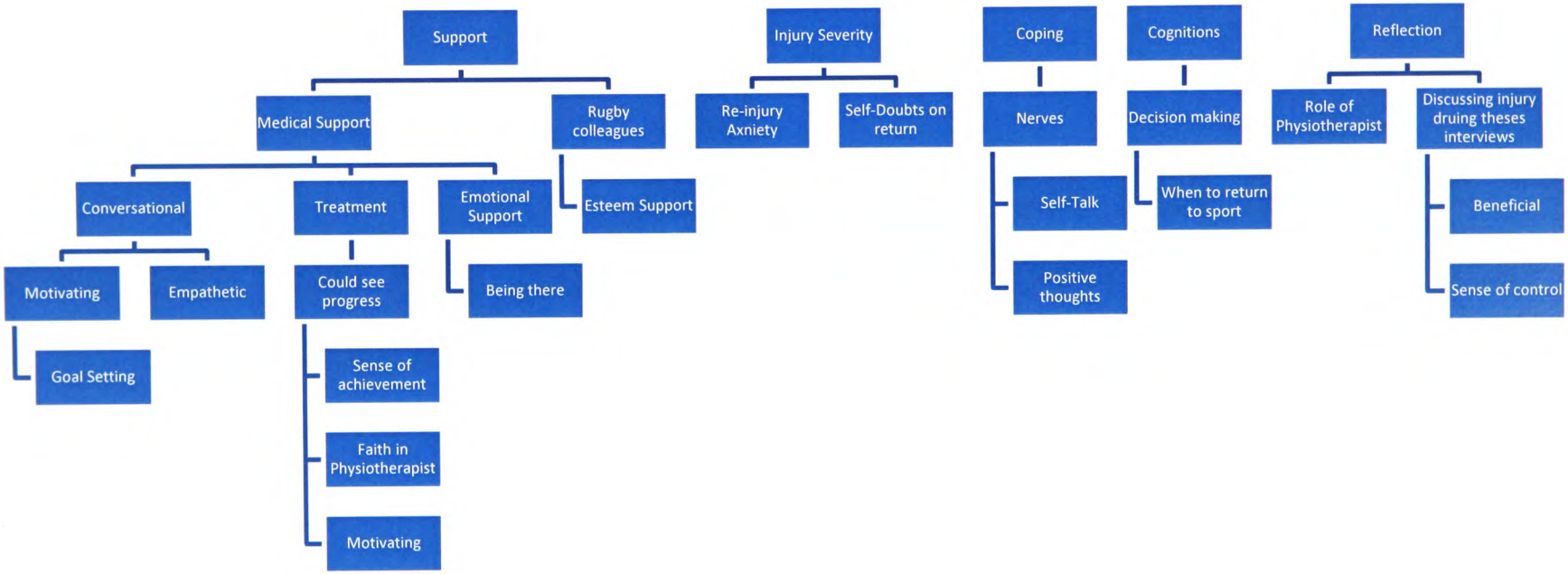
Diagrammatical Thematic Map for Phillip during the mid-phase (Interview 2- continued).



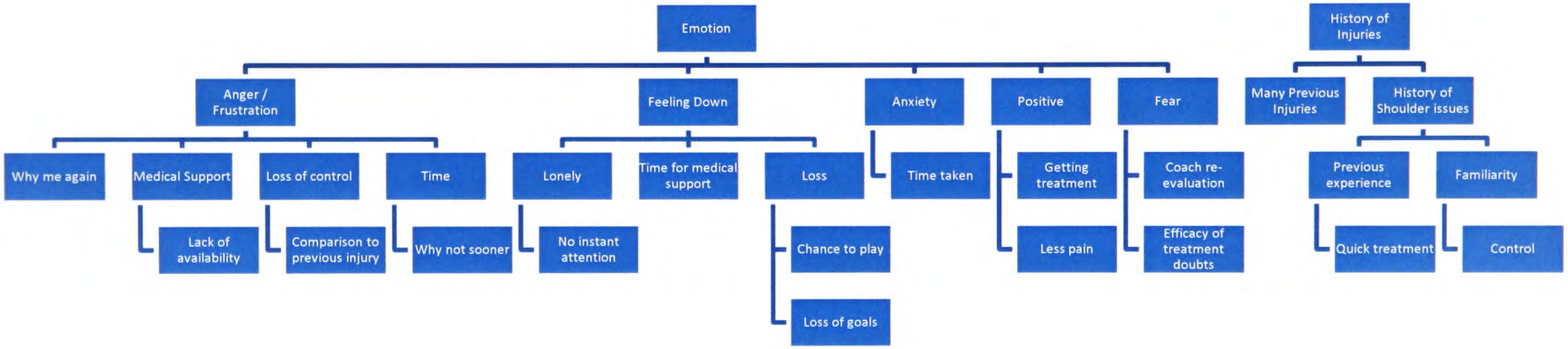
Diagrammatical Thematic Map for Phillip during the end-phase (Interview 3).



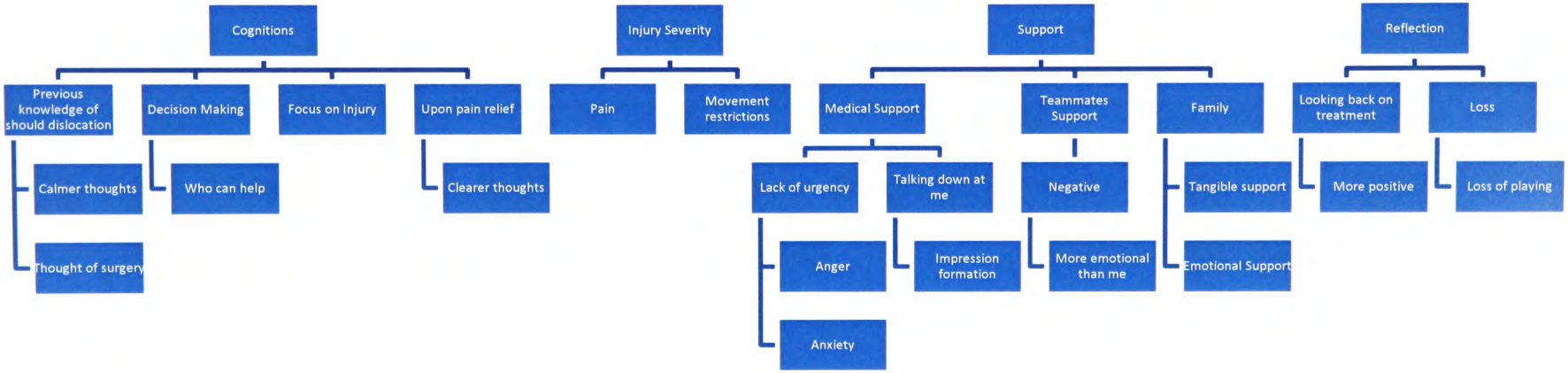
Diagrammatical Thematic Map for Phillip during the end phase (Interview 3 – Continued).



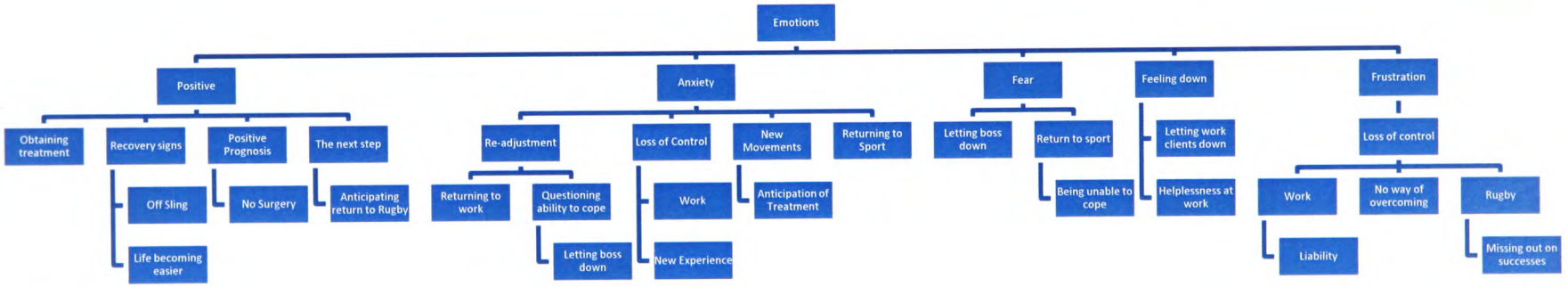
Diagrammatical Thematic Map for Jeremy at the onset of injury (Interview 1).



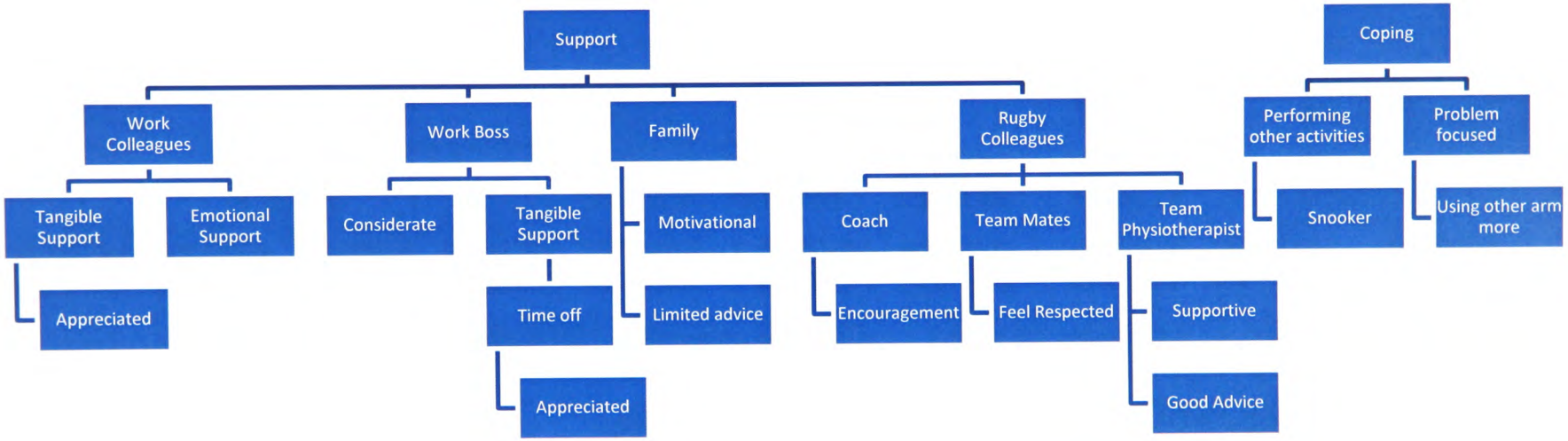
Diagrammatical Thematic Map for Jeremy at the onset of injury (Interview 1 – Continued).



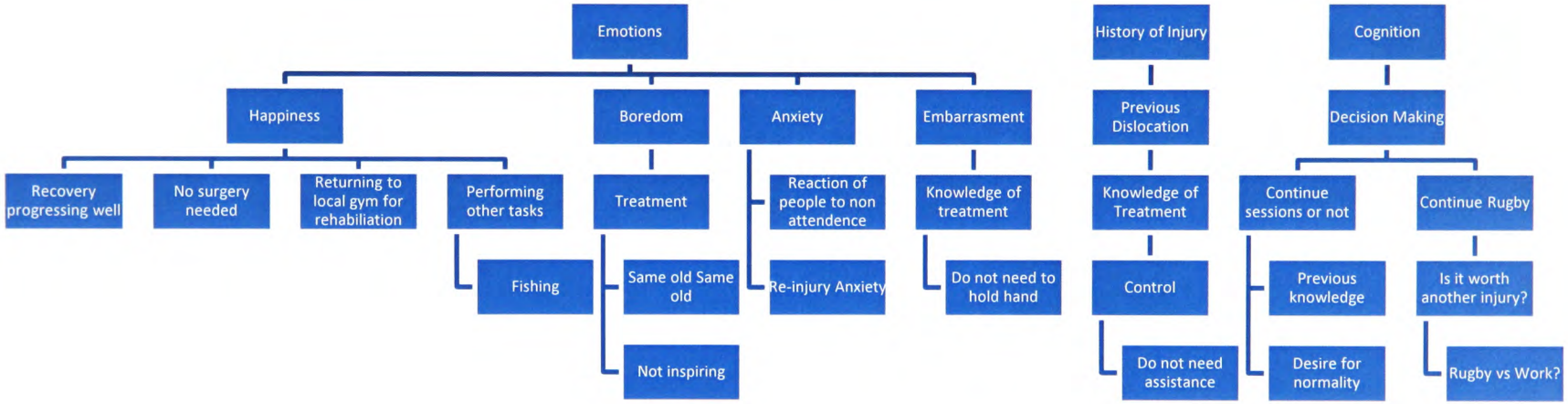
Diagrammatical Thematic Map for Jeremy during the mid-phase (Interview 2).



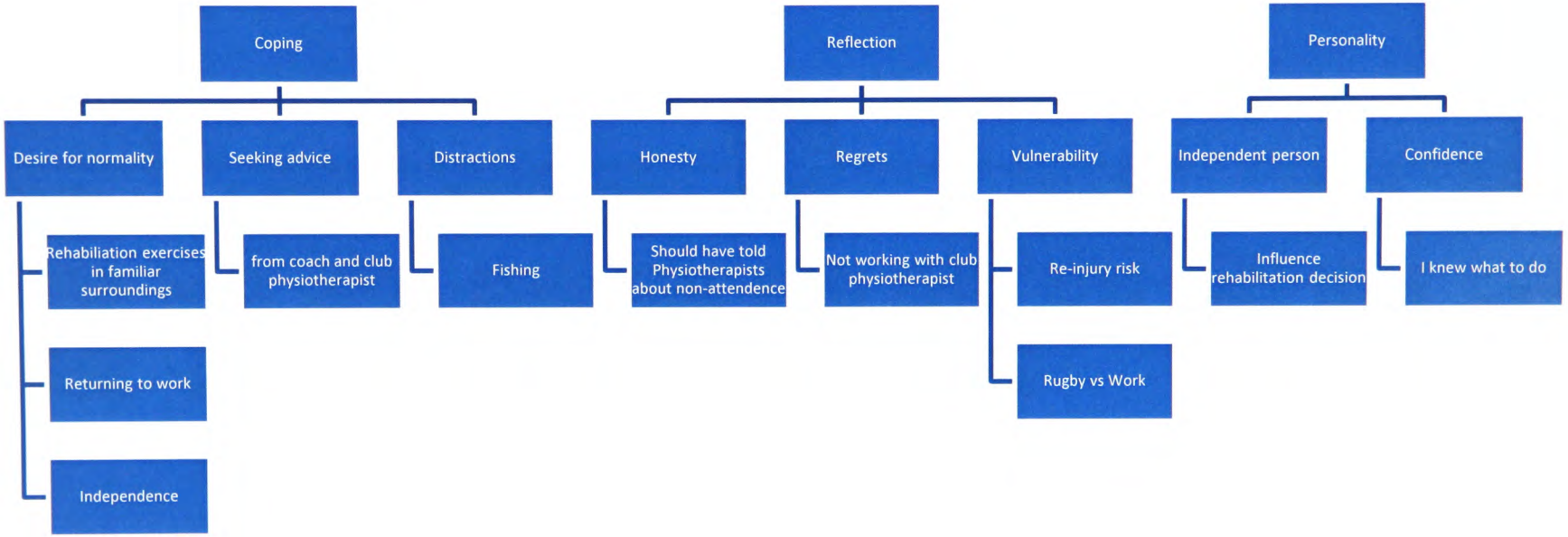
Diagrammatical Thematic Map for Jeremy during the mid-phase (Interview 2 – continued).



Diagrammatical Thematic Map for Jeremy during the end-phase (Interview 3).

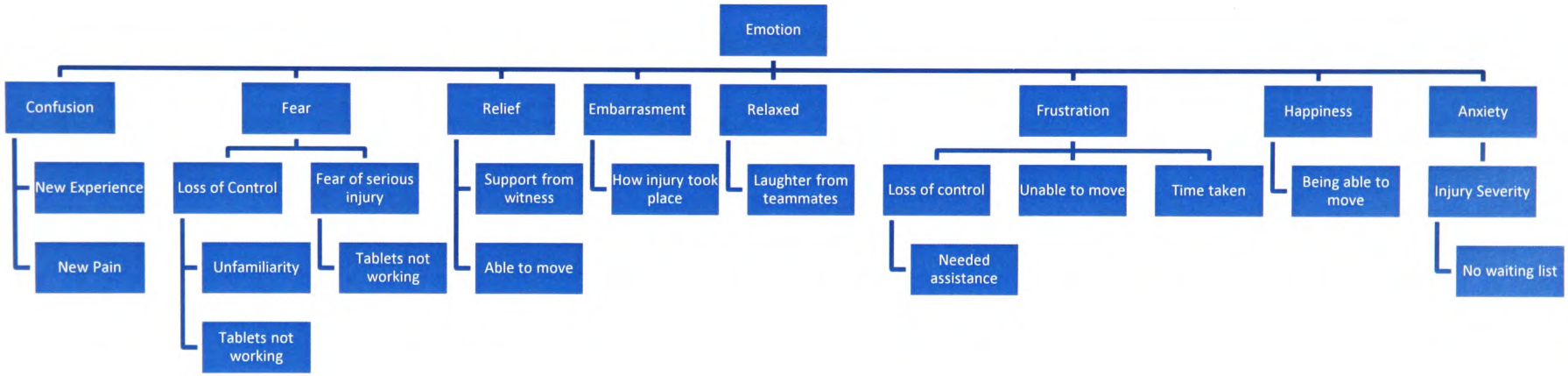


Diagrammatical Thematic Map for Jeremy during the end-phase (Interview 3 – continued).

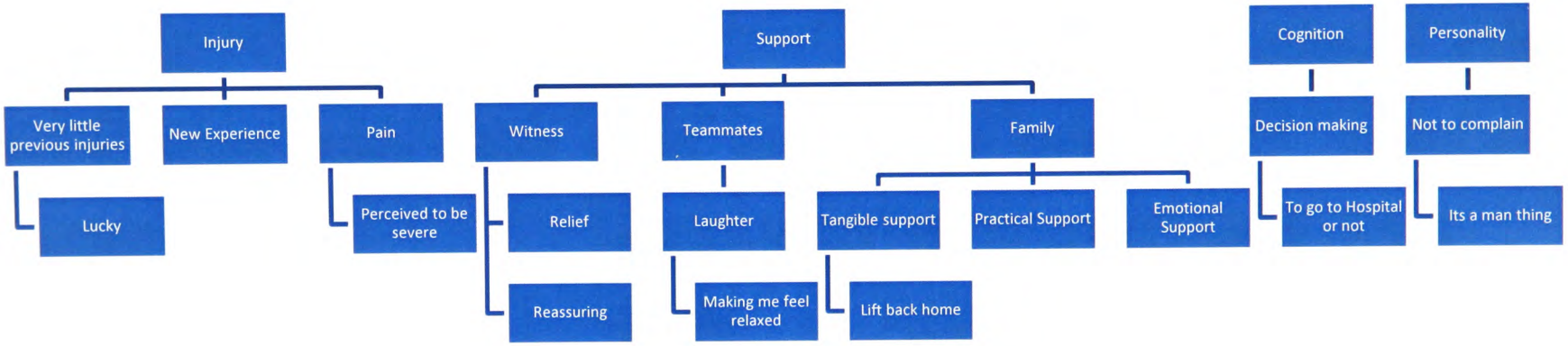


Diagrammatical Representations of Themes for Participant 4 – Interview 1

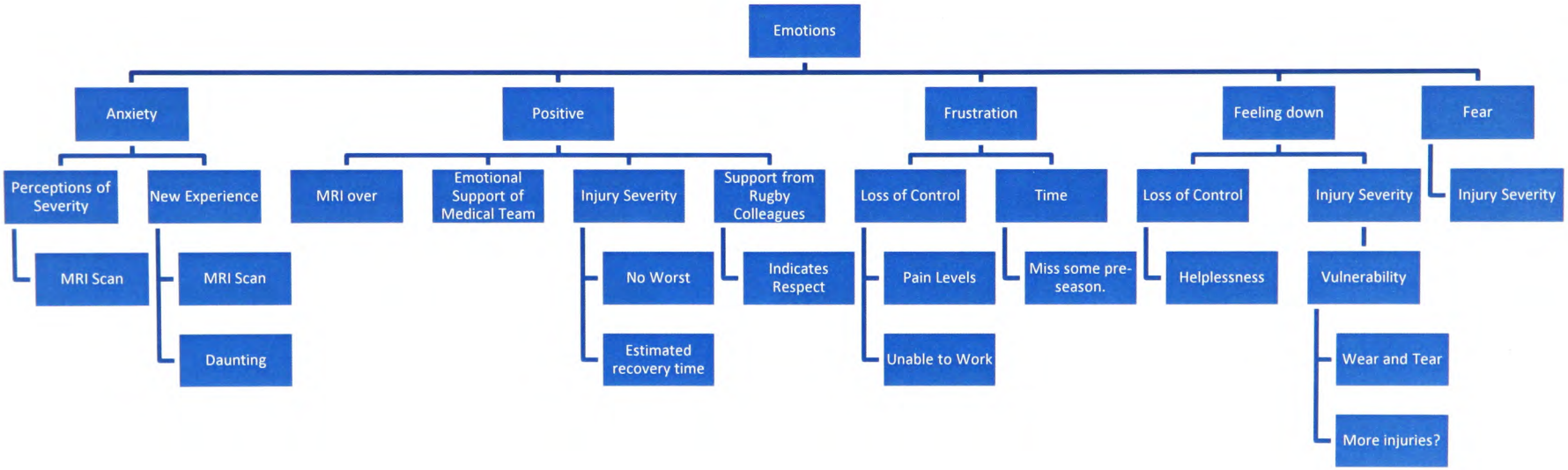
Diagrammatical Thematic Map for Alex at the onset of injury (Interview 1)



Diagrammatical Thematic Map for Alex at the onset of injury (Interview 1- continued).

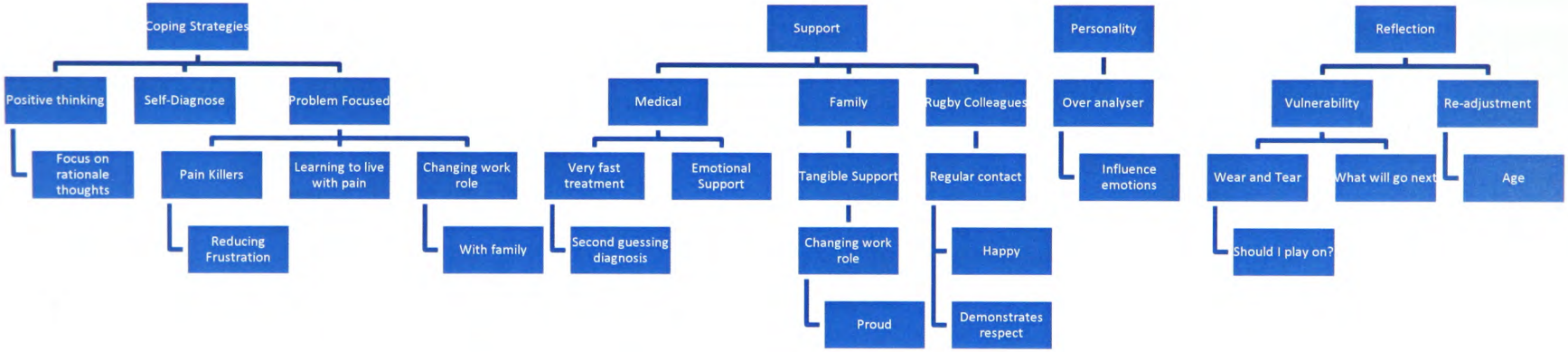


Diagrammatical Thematic Map for Alex during the mid-phase (Interview 2).

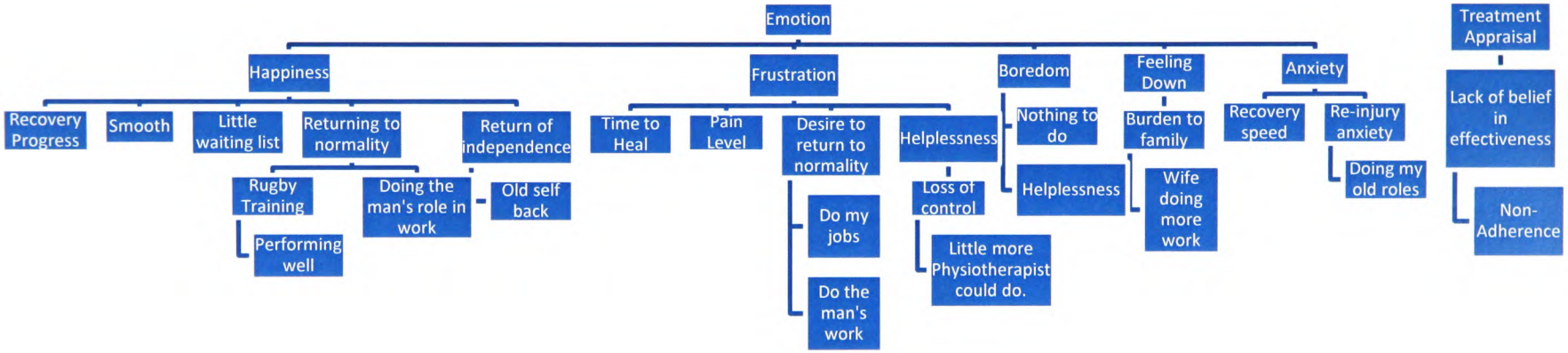


Diagrammatical Representations of Themes for Participant 4 – Interview 2

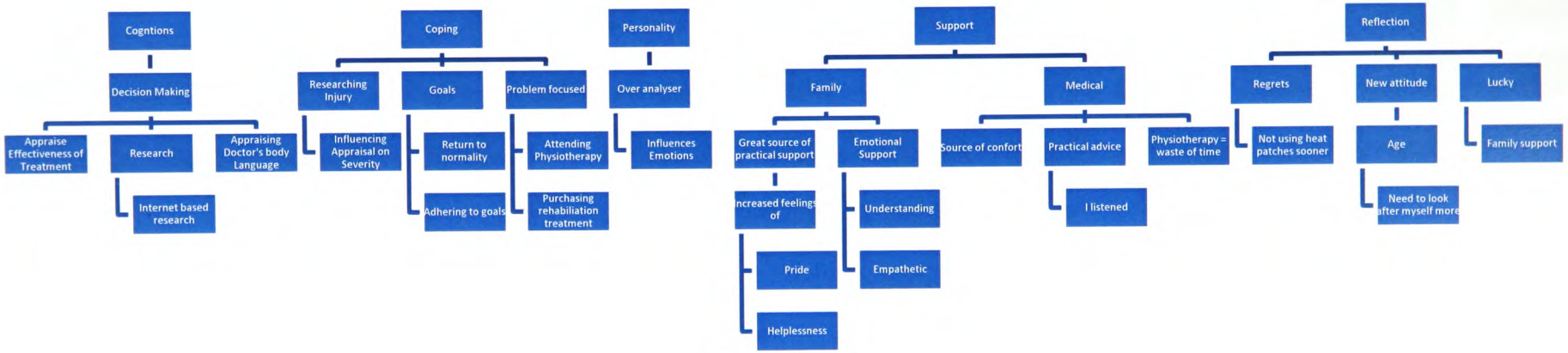
Diagrammatical Thematic Map for Alex during the mid-phase (Interview 2 – continued).



Diagrammatical Thematic Map for Alex during the end-phase (Interview 3).

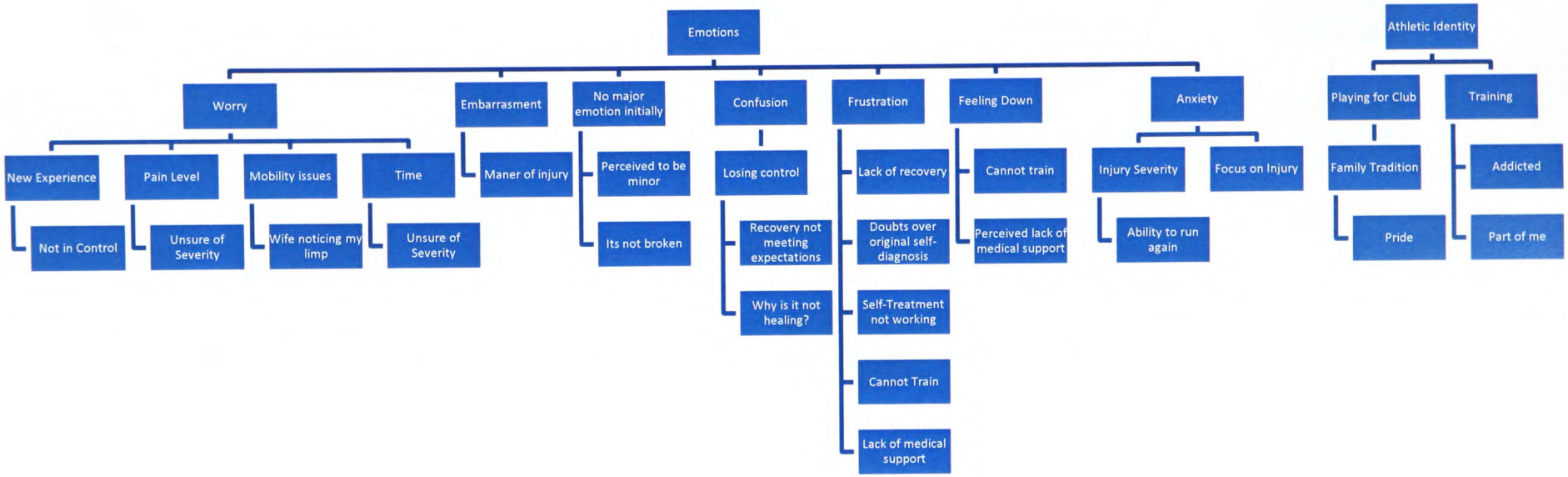


Diagrammatical Thematic Map for Alex during the end-phase (Interview 3 – continued).

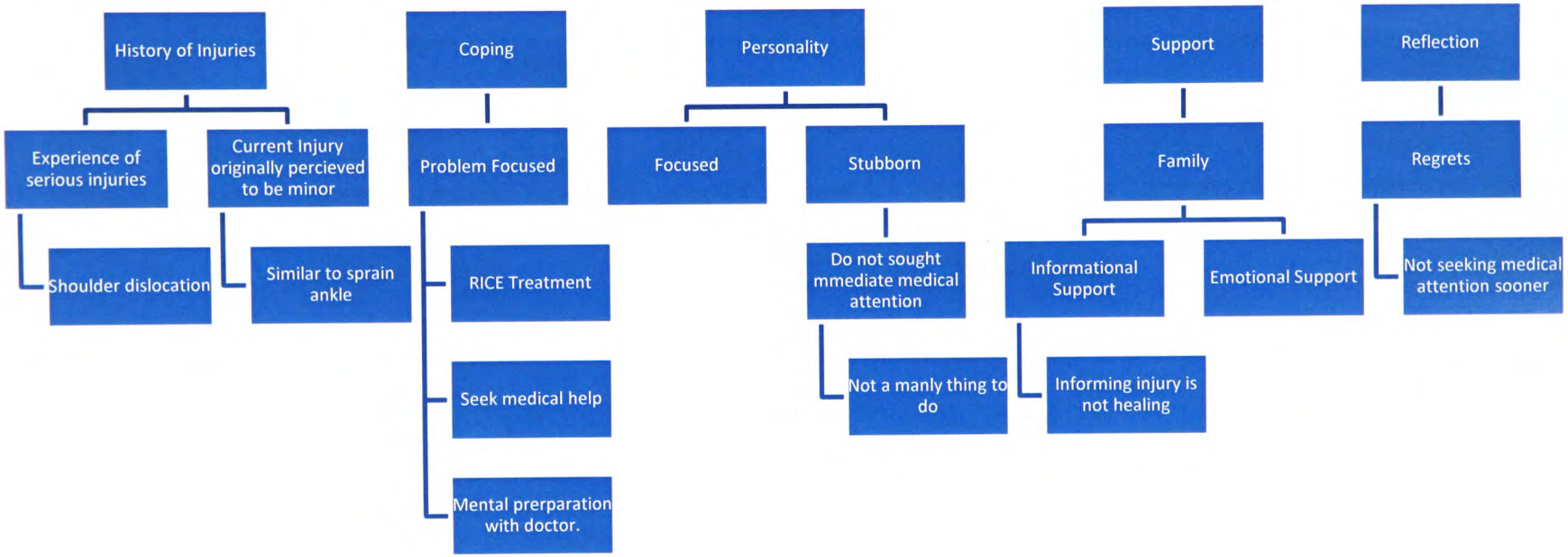


Diagrammatical Representations of Themes for Participant 5 – Interview 1

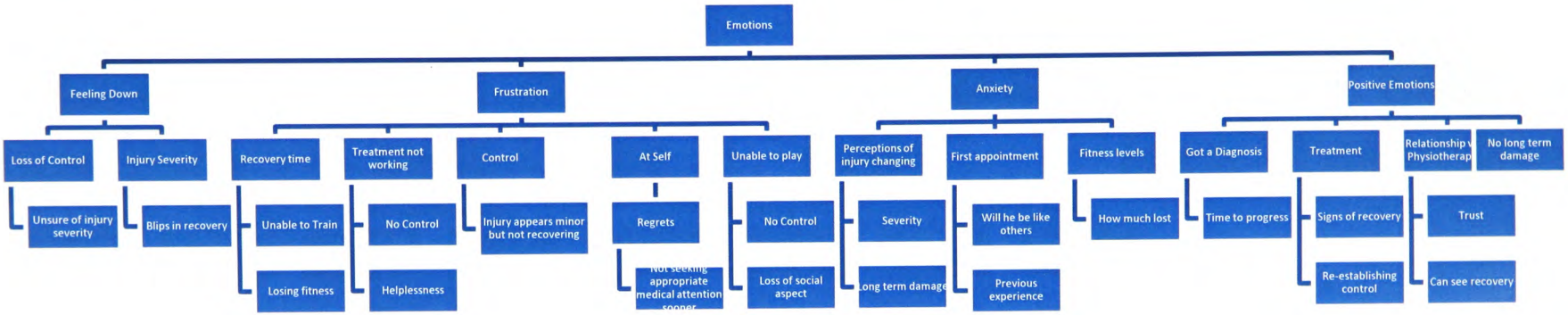
Diagrammatical Thematic Map for Peter at the onset of injury (Interview 1).



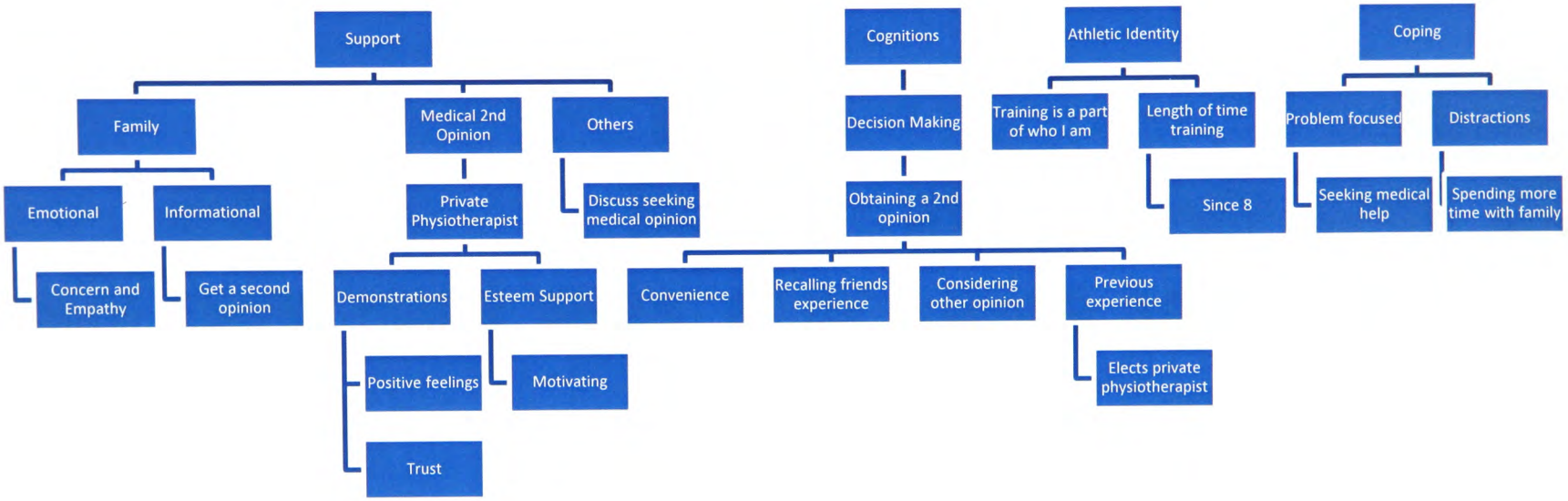
Diagrammatical Thematic Map for Peter at the onset of injury (Interview 1- continued).



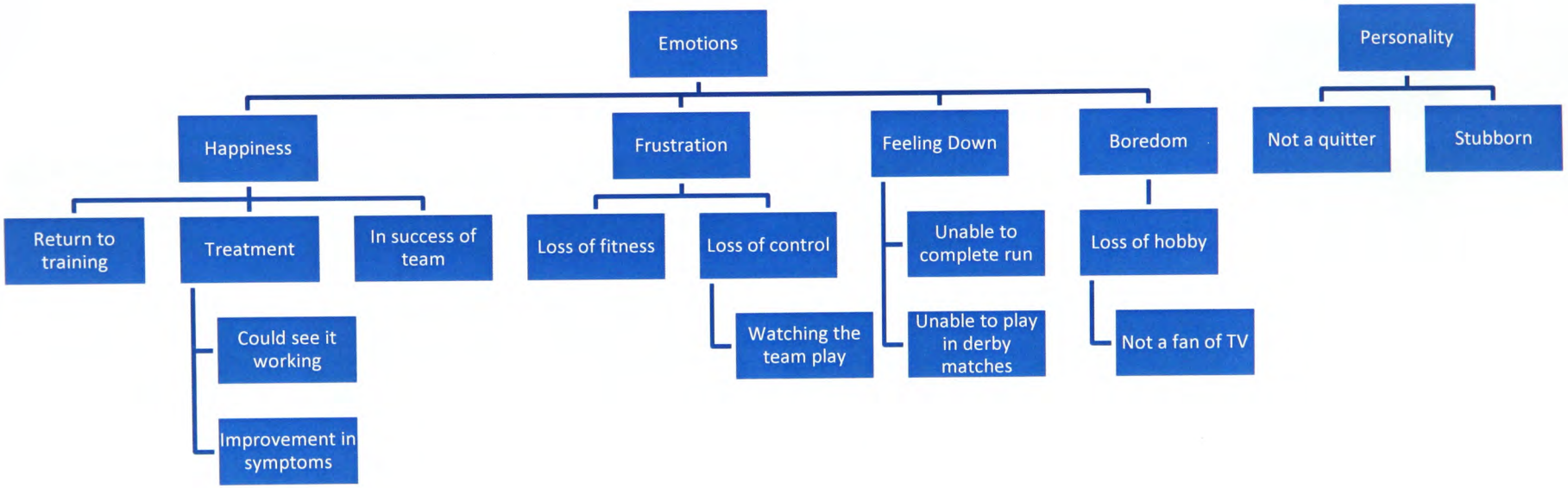
Diagrammatical Thematic Map for Peter during the mid-phase (Interview 2).



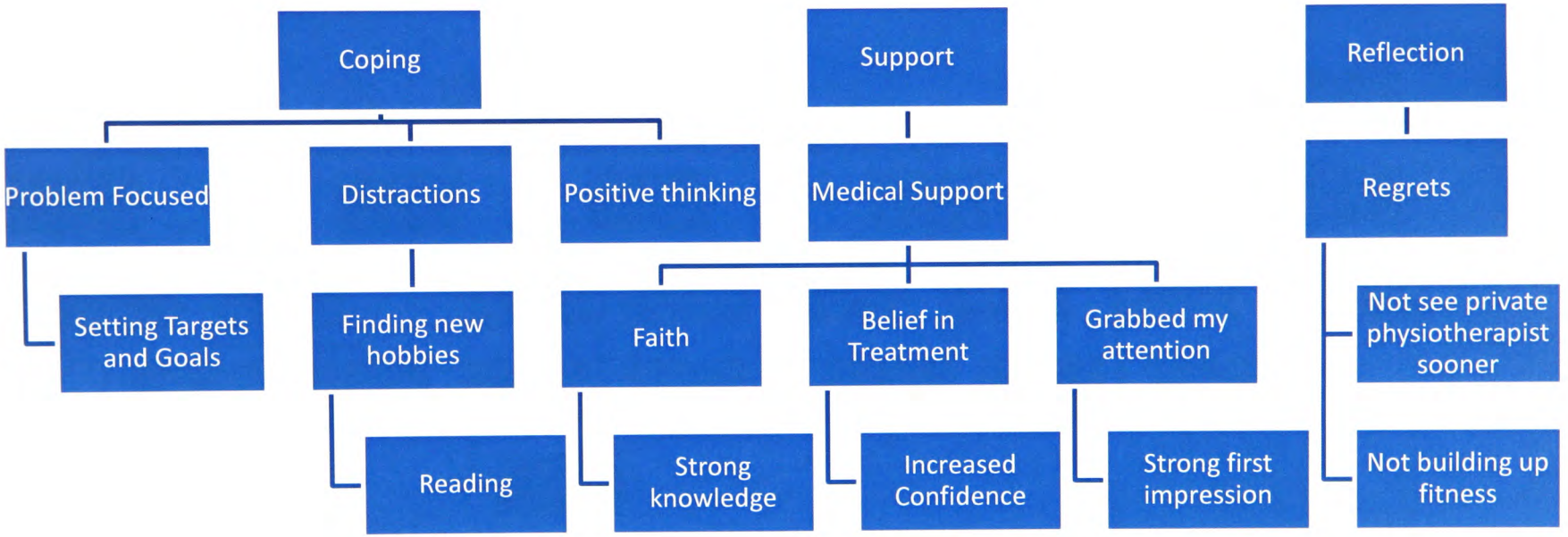
Diagrammatical Thematic Map for Peter during the mid-phase (Interview 2 – continued).



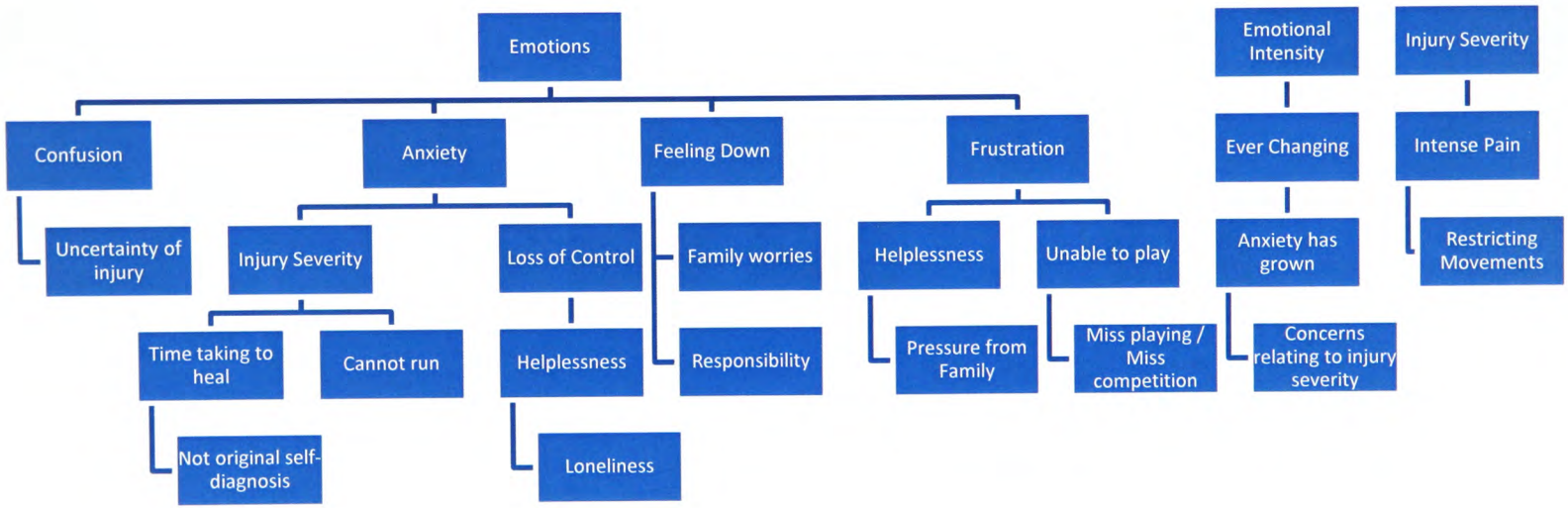
Diagrammatical Thematic Map for Peter during the end-phase (Interview 3)



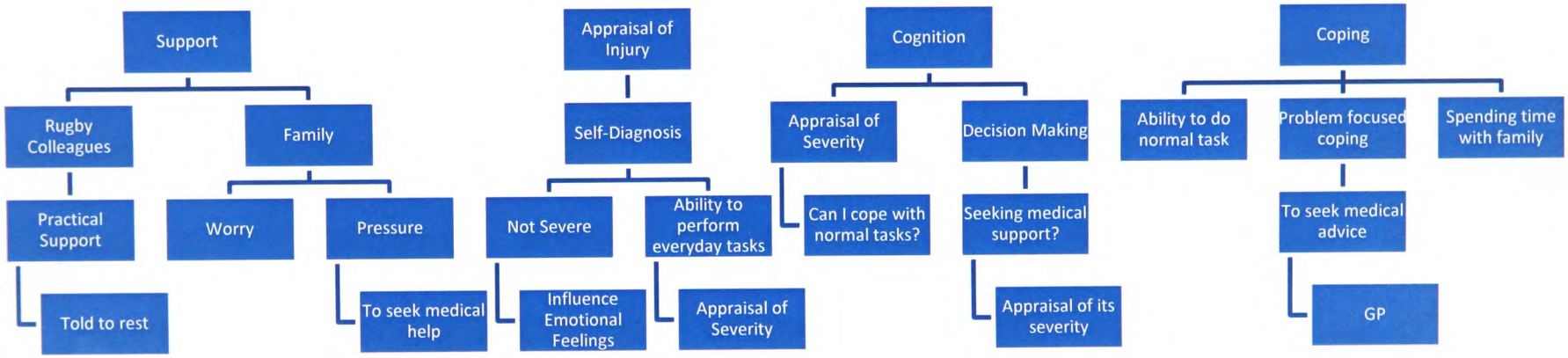
Diagrammatical Thematic Map for Peter during the end-phase (Interview 3 – continued).



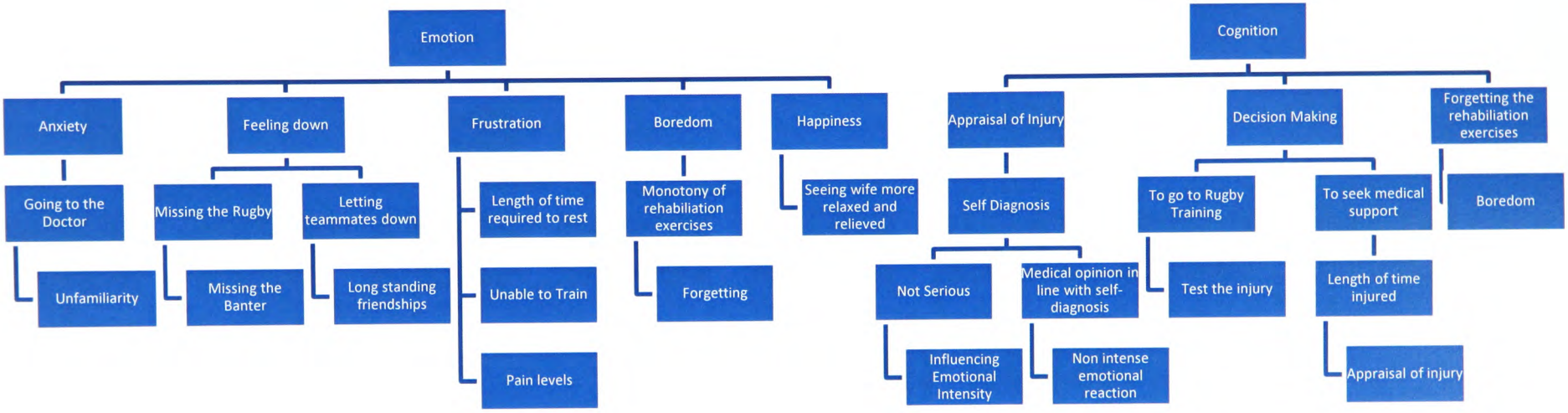
Diagrammatical Thematic Map for Richard at the onset of injury (Interview 1).



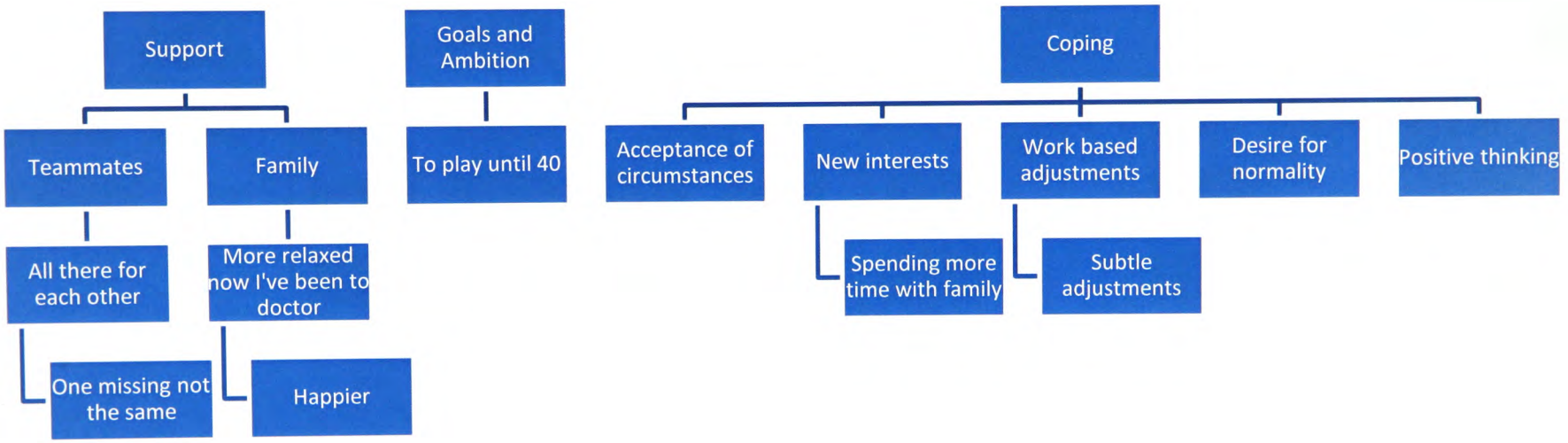
Diagrammatical Thematic Map for Richard at the onset of injury (Interview 1 – continued)



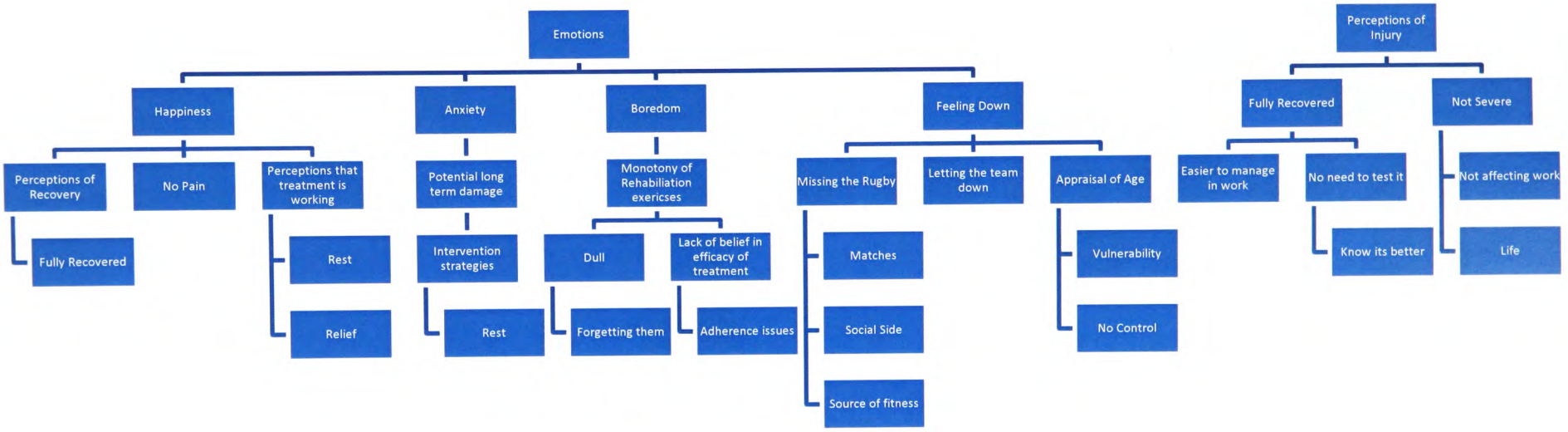
Diagrammatical Thematic Map for Richard during the mid-phase (Interview 2).



Diagrammatical Thematic Map for Richard during the mid-phase (Interview 2 – continued).

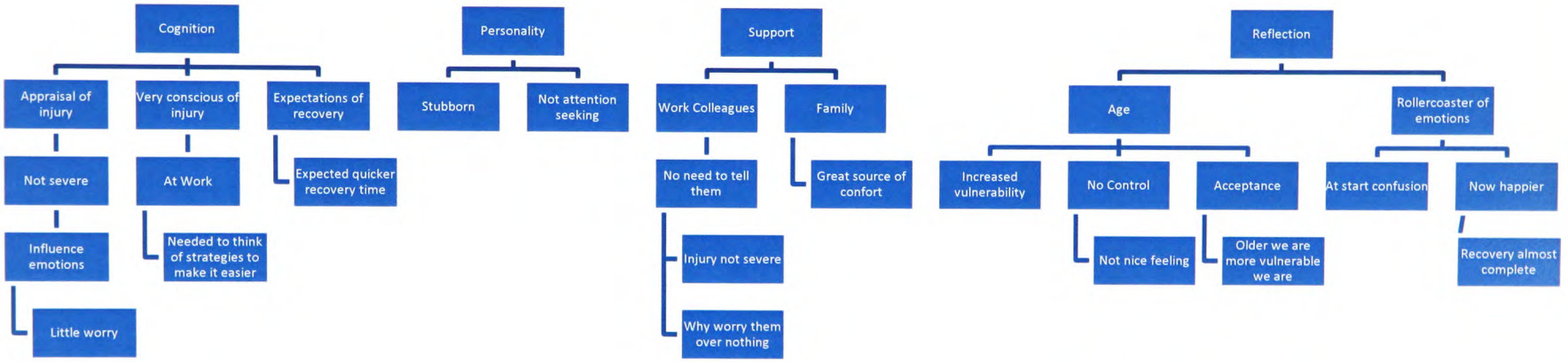


Diagrammatical Thematic Map for Richard during the end-phase (Interview 3)



Diagrammatical Representations of Themes for Participant 6 – Interview 3

Diagrammatical Thematic Map for Richard during the end-phase (Interview 3 – continued)



Focus Groups Schedule – First Focus Group.

Ice breaker task.

1) List of feelings on the table, ask physios to discuss which ones they feel recreational rugby union players experience as a consequence of their injury.

2) Is it difficult to tell how an injured athlete is feeling?

3) Tell me, what feelings do you think injured athletes experience?

4) Are there any on the list that they do not experience.

Factors influence the emotional response

5) What factors do you think are important to rehabilitation?
6) Tell me about the feelings they can experience
7) What circumstances?
8) What factors to you think influence their feelings
9) Do you think it is difficult to work out how people are feeling?
10) How much do you think it affects your job?
11) Tell me about how the patients feelings may influence your job?
12) What factors do you think influence injured athletes' feelings during rehabilitation?

Focus Group Schedule – Second Focus Group

Role of Physiotherapist.

1) Tell me your views about your role in relation to recovery?
2) Tell me about your experiences in relation to helping the injured athlete with his/her feelings?
3) Do you use different strategies for different injuries?
4) Tell me about the support you offer injured recreational level rugby union players?
5) How do you think your role influences their well-being?
6) Tell me about the training you have in applying goal setting?
7) Same question for social support?
8) Tell me your views about the psychology of injury in recreational rugby union players?
9) Do you think the advice you give can influence their feelings?
10) Tell me what you know about social support?
11) Do you think the training is consistent across the health care sector?
12) Tell me what you know about imagery in sports injury rehabilitation?
13) What do the injured rugby players tell you about your work?
14) Do you do to try to motivate the injured athletes?
15) Tell me about your experiences in dealing with highly emotional injured athletes?
16) Tell me what you know about self-talk?
17) Tell me what you know about relaxation techniques?
18) Tell me about the type of training you have had in dealing with this.
19) What are your views on the training given?

Appendix 40 Original List of Statements / Phrases for Questionnaire Development

1. Since my injury I have felt more stressed than normal
2. Since my injury I do not know what to do
3. Since my injury I feel guilty
4. Since my injury I have been angry with others
5. Since the injury I find it difficult to talk to others
6. I have felt angry with myself about my injury
7. I have had feelings of surprise since my injury
8. I have felt annoyed at my recovery progress
9. I have felt a sense of shock since my injury
10. I have felt disappointed about my recovery progress
11. I have felt that life has been unkind since my injury
12. Since my injury, life has felt chaotic
13. Since my injury I have felt fearful about not making a full recovery
14. Since my injury I have felt scared about returning to sport
15. Nothing has concerned me since my injury
16. I have felt calm since my injury
17. I have felt nervous since my injury
18. I have felt quite down since my injury
19. Nothing has really changed since my injury
20. Since my injury I feel more apprehensive
21. I feel confused about my recovery progress
22. Since my injury I have felt calm when thinking about the future
23. I feel at ease when thinking about my injury
24. The thought of a return to sport fills me with dread
25. Since my injury I do not feel happy with myself
26. I am nervous about returning to sport
27. I have felt happy about my recovery progress
28. Since my injury I have been focused on my recovery
29. Since my injury I have felt scared about my future
30. Since the injury I have felt excited
31. I have felt tense since my injury
32. Since my injury I don't know what the future holds
33. The consequences of my injury do not concern me
34. The recovery process has made me feel low
35. Since my injury I have felt excited at the thought of a full recovery
36. I have felt a strong sense of anger because of my injury
37. Since my injury there have been times where I have felt low
38. I find it difficult to keep calm since my injury
39. Since my injury I have felt frustrated
40. I have felt calm since my injury
41. Since the injury I feel more lonely
42. I have felt optimistic about my recovery progress since my injury
43. This injury is of major concern to me
44. I have felt happy since my injury
45. I have suffered from panic attacks since my injury
46. I lose my temper quickly since my injury
47. I have felt dejected since my injury
48. Since the injury I have lost interest in everything

49. Since the injury I feel like I cannot help myself in anyway
50. Since the injury I feel it is hard to maintain an interest in my recovery
51. Since the injury I have felt worthless
52. Since my injury I have felt dejected
53. There have been times when I dread to think about what is going to happen
54. I worry a lot since my injury
55. Since my injury I feel more irritable
56. Since my injury I have felt agitated
57. Since my injury I have felt anxious about my recovery progress
58. Since my injury, there have been times where I have felt sad
59. Since the injury life has had little meaning to me
60. Since my injury I get bored easily
61. Since my injury I feel that I do not know what is going on
62. There have been times where I have felt depressed about my recovery progress
63. Since the injury I feel more sorry for myself
64. There have been times when I have felt frightened about the consequences of this injury
65. Since the injury I have not felt enthusiastic about my recovery progress
66. There have been times when I have felt a sense of relief since my injury
67. Since the injury I have felt contented with my recovery progress
68. Since my injury there have been times when I fear a re-injury
69. I have felt composed and clear when has come to making decisions about my injury
70. There have been times when I have had a feeling of euphoria since my injury
71. Since my injury I have felt fearful about a return to sport
72. Since my injury I get easily distracted
73. I feel more impatient since my injury
74. Since my injury I have days where my mind seems elsewhere
75. Since the injury there have been times where my recovery is not high on my priorities
76. At times I feel like I have more questions than answers about my injury
77. Since my injury I have always understood clearly about the severity of my injury
78. Since the injury there have been times where I felt no enthusiasm to recover
79. There have been times when I have felt a sense of joy since my injury
80. Since my injury there are times in which I do not care about my recovery

Appendix 41 Demographic Questionnaire Study 3 and 4

Questionnaire Part 1.

Thank you for participating in this survey. The aim of this part of the survey is to establish demographic details about yourself, your current injury and your sporting participation. Please answer honestly based on your on your current injury status, there are no right or wrong answer

Age Sex M / F

1. List in order of preference the sports and activities that you participate in.
   A_____ B_____
   C_____ D_____

2. Please circle the level in which you have participated in Rugby (please circle more than one if applicable).
   Recreational
   Aged range county/regional
   Aged range international
   Senior county level
   Senior Semi Professional
   Senior Professional
   International

3. What level were you playing at in Rugby just prior to your injury (please circle one).
   Recreational
   Semi Professional
   Professional (non international)
   International

4. Would you describe yourself as an athlete (please circle).
   1 2 3 4 5
   Absolutely Not Absolutely Yes.

5. Did your injury take place because of playing Rugby or Rugby Training?
   YES / NO

6. Has your current injury resulted in you not being able to fully participate in Rugby Matches and/or Training sessions.
   YES / NO

   If yes, please state how many _____

7. Describe your injury _____

8. Have you been given a diagnosis by a Doctor/Physiotherapist (please circle as appropriate)
   YES / NO

9. If YES what has been the diagnosis _____

10. Approximately how long have you had the injury?
    _____ Years _____ Months_____Weeks_____Days

11. At what point in the Rugby season (circle one)?
    Before Season Mid Season End of Season

12. On a scale of one to ten please circle the level of pain you are because of your injury.
    1 2 3 4 5 6 7 8 9 `10
    No Pain Extreme Pain

13. When is your estimated return to sport?
    _____ Years _____ Months_____Weeks_____Days

14. If 0% is no recovery, what percentage of recovery to your pre-injury status have you made (please circle)?
    0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

15. Have you ever been injured before (please circle)?
    Yes No

16. Have you ever had this type of injury happened before (please circle)?
    Yes No

17. If so, when? ____/____/____

18. Please describe your previous injuries (if applicable).
    _____
    _____
    _____
    ____

Emotional Responses to Rugby Union Injury Questionnaire.

Thank you for participating in this survey being conducted by the University of Glamorgan. The aim of the survey is to look at how you have felt since your injury. Please answer honestly based on your own experiences relating to your current injury, there are no right or wrong answers.

Please respond to the following statements using the 1-5 scale shown on the right by circling how **often** you have experienced these feelings **since your injury**.

		Never	Very Rarely	Occasionally	Quite Often	Very Often
1	Since my injury I feel more irritable	1	2	3	4	5
2	I worry a lot since my injury	1	2	3	4	5
3	I have felt disappointed about my recovery progress	1	2	3	4	5
4	Since my injury, there have been times where I have felt sad	1	2	3	4	5
5	Since my injury there are times in which I do not care about my recovery	1	2	3	4	5
6	Since my injury I have felt anxious about my recovery progress	1	2	3	4	5
7	Since the injury I have lost interest in everything	1	2	3	4	5
8	Since my injury I have felt more stressed than normal	1	2	3	4	5
9	Since my injury I have been angry with others	1	2	3	4	5

		Never	Very Rarely	Occasionally	Quite Often	Very Often
10	Since my injury I have felt calm when thinking about the future	1	2	3	4	5
11	Since my injury I have been focused on my recovery	1	2	3	4	5
12	I have suffered from panic attacks since my injury	1	2	3	4	5
13	Since the injury I feel it is hard to maintain an interest in my recovery	1	2	3	4	5
14	Since the injury I feel like I cannot help myself in any way	1	2	3	4	5
15	There have been times when I have felt a sense of joy since my injury	1	2	3	4	5
16	Since my injury I have felt scared about my future	1	2	3	4	5
17	I have felt angry with myself about my injury	1	2	3	4	5
18	Since my injury, life has felt chaotic	1	2	3	4	5
19	I feel confused about my recovery progress	1	2	3	4	5
20	I have felt happy about my recovery progress	1	2	3	4	5
21	There have been times when I dread to think about what is going to happen	1	2	3	4	5
22	Since the injury there have been times where I felt no enthusiasm to recover	1	2	3	4	5
23	I have felt annoyed at my recovery progress	1	2	3	4	5
24	Since my injury I have felt fearful about not making a full recovery	1	2	3	4	5

		Never	Very Rarely	Occasionally	Quite Often	Very Often
25	I feel at ease when thinking about my injury	1	2	3	4	5
26	Since the injury I have felt worthless	1	2	3	4	5
27	Since my injury I have always understood clearly about the severity of my injury	1	2	3	4	5
28	Since my injury I get bored easily	1	2	3	4	5
29	Nothing has concerned me since my injury	1	2	3	4	5
30	There have been times when I have felt a sense of relief since my injury	1	2	3	4	5
31	There have been times when I have had a feeling of euphoria since my injury	1	2	3	4	5
32	Since the injury I feel more sorry for myself	1	2	3	4	5
33	I have felt optimistic about my recovery progress since my injury	1	2	3	4	5
34	Since my injury I feel that I do not know what is going on	1	2	3	4	5
35	I have felt calm since my injury	1	2	3	4	5
36	Since the injury I feel more lonely	1	2	3	4	5
37	There have been times when I have felt frightened about the consequences of this injury	1	2	3	4	5
38	Since the injury I have not felt enthusiastic about my recovery progress	1	2	3	4	5
39	The consequences of my injury do not concern me	1	2	3	4	5
40	There have been times where I have felt depressed about my recovery progress	1	2	3	4	5

		Never	Very Rarely	Occasionally	Quite Often	Very Often
41	Since my injury there have been times when I fear a re-injury	1	2	3	4	5
42	I have felt quite down since my injury	1	2	3	4	5
43	Since my injury I have felt fearful about a return to sport	1	2	3	4	5
44	Since my injury I have felt excited at the thought of a full recovery	1	2	3	4	5
45	I have felt composed and clear when has come to making decisions about my injury	1	2	3	4	5
46	Since the injury I have felt contented with my recovery progress	1	2	3	4	5
47	Since my injury there have been times where I have felt low	1	2	3	4	5
48	I feel more impatient since my injury	1	2	3	4	5
49	Since my injury I have days where my mind seems elsewhere	1	2	3	4	5
50	Since the injury there have been times where my recovery is not high on my priorities	1	2	3	4	5
51	I have felt tense since my injury	1	2	3	4	5
52	Since my injury I get easily distracted	1	2	3	4	5
53	I find it difficult to keep calm since my injury	1	2	3	4	5
54	Since my injury I don't know what the future holds	1	2	3	4	5
55	Since my injury I have felt frustrated	1	2	3	4	5
56	At times I feel like I have more questions than answers about my injury	1	2	3	4	5

Injury coding list.

1. Achilles Injury
2. Ligament Tear
3. Broken Rib / Rib Damage
4. Metatarsal Broken / Broken Toes
5. Ankle Injury / Sprain
6. Broken Leg
7. Back Injury Not Diagnosed
8. Broken Hand
9. Broken Nose
10. Knee Injury – Non Diagnosis / Not Clear
11. Arm Injury – Unclear
12. Dead Leg
13. Leg Injury – Not Clear
14. Torn Hamstring
15. Broken Ankle
16. Hip Injury – Unclear
17. Dislocated Knuckle
18. Whiplash
19. Tennis Elbow
20. Knee Injury – Tear Ligaments
21. Shin Splints
22. Pulled muscle in Back
23. Cuts
24. Runners Knee
25. Frozen Shoulder
26. Hip Bursitis
27. Broken Arm
28. Muscle Cramp
29. Back injury – diagnosed (12 vertebrae)
30. Torn Bicep
31. Broken Foot
32. Wrist Injury – Unclear
33. Broken Collarbone
34. Multiple Leg Break
35. Broken Back
36. Concussion
37. Torn Ear / Earlobe
38. Golfers Elbow
39. Head Injury / Cut
40. Broken Jaw
41. Broken Cheek Bone
42. Ingrowing Toe Nail
43. Broken Wrist
44. Broken Eye Socket
45. Shattered Knee Cap
46. Broken Thumb
47. Dislocated Shoulder
48. Shoulder Separation (3 grade)
49. Multiple Head Injuries

50. Sciatica
51. Foot Injury – twisted / Unclear
52. Cut Thumb
53. Cracked / Broken Skull
54. Dislocated Knee
55. Slipped Disc Neck
56. Torn Rotator Cuff
57. Muscle Injury - Unclear)
58. Dislocated Elbow
59. Stomach Strain
60. Sternum Separation
61. Broken Finger
62. Groin Strain
63. Sinus Cavity injury
64. Compartment Syndrome
65. Soft Tissue neck injury
66. Slipped Disc in Back
67. Muscle Pull in Leg
68. Broken Ankle
69. Hip Injury – Dysfunction
70. Cut Tongue
71. ACL Injury – Requires surgery
72. Eye Damage (unclear / Black Eye)
73. Hamstring Strain
74. Multiple up body bone break
75. Dislocated disc in neck
76. Elbow Injury – Undiagnosed / Unclear
77. Multiple Arm Break
78. Neck Injury – Undiagnosed / Unclear.

Emotional Responses to Rugby Union Injury Scale.

Thank you for participating in this survey being conducted by the University of Glamorgan. The aim of the survey is to look at how you have felt since your injury. Please answer honestly based on your own experiences relating to your current injury; there are no right or wrong answers.

Please respond to the following statements using the 1-5 scale shown on the right by circling how **often** you have experienced these feelings **since your injury**.

		Never	Very Rarely	Occasionally	Quite Often	Very Often
1	Since my injury I feel more irritable	1	2	3	4	5
2	I worry a lot since my injury	1	2	3	4	5
3	I have felt disappointed about my recovery progress	1	2	3	4	5
4	Since my injury, there have been times where I have felt sad	1	2	3	4	5
5	Since my injury there are times in which I do not care about my recovery	1	2	3	4	5
6	Since my injury I have felt anxious about my recovery progress	1	2	3	4	5
7	Since the injury I have lost interest in everything	1	2	3	4	5
8	Since my injury I have felt more stressed than normal	1	2	3	4	5
9	Since my injury I have been angry with others	1	2	3	4	5

		Never	Very Rarely	Occasionally	Quite Often	Very Often
10	Since my injury I have felt calm when thinking about the future	1	2	3	4	5
11	Since my injury I have been focused on my recovery	1	2	3	4	5
12	I have suffered from panic attacks since my injury	1	2	3	4	5
13	Since the injury I feel it is hard to maintain an interest in my recovery	1	2	3	4	5
14	Since the injury I feel like I cannot help myself in any way	1	2	3	4	5
15	There have been times when I have felt a sense of joy since my injury	1	2	3	4	5
16	Since my injury I have felt scared about my future	1	2	3	4	5
17	I have felt angry with myself about my injury	1	2	3	4	5
18	I feel confused about my recovery progress	1	2	3	4	5
19	I have felt happy about my recovery progress	1	2	3	4	5
20	There have been times when I dread to think about what is going to happen	1	2	3	4	5
21	Since the injury there have been times where I felt no enthusiasm to recover	1	2	3	4	5
22	I have felt annoyed at my recovery progress	1	2	3	4	5
23	Since my injury I have felt fearful about not making a full recovery	1	2	3	4	5

		Never	Very Rarely	Occasionally	Quite Often	Very Often
24	Since the injury I have felt worthless	1	2	3	4	5
25	Since my injury I have always understood clearly about the severity of my injury	1	2	3	4	5
26	Since my injury I get bored easily	1	2	3	4	5
27	Nothing has concerned me since my injury	1	2	3	4	5
28	There have been times when I have felt a sense of relief since my injury	1	2	3	4	5
29	There have been times when I have had a feeling of euphoria since my injury	1	2	3	4	5
30	Since the injury I feel more sorry for myself	1	2	3	4	5
31	I have felt optimistic about my recovery progress since my injury	1	2	3	4	5
32	Since my injury I feel that I do not know what is going on	1	2	3	4	5
33	I have felt calm since my injury	1	2	3	4	5
34	Since the injury I feel more lonely	1	2	3	4	5
35	There have been times when I have felt frightened about the consequences of this injury	1	2	3	4	5
36	The consequences of my injury do not concern me	1	2	3	4	5
37	There have been times where I have felt depressed about my recovery progress	1	2	3	4	5

		Never	Very Rarely	Occasionally	Quite Often	Very Often
38	Since my injury there have been times when I fear a re-injury	1	2	3	4	5
39	I have felt quite down since my injury	1	2	3	4	5
40	Since my injury I have felt fearful about a return to sport	1	2	3	4	5
41	I have felt composed and clear when has come to making decisions about my injury	1	2	3	4	5
42	Since the injury I have felt contented with my recovery progress	1	2	3	4	5
43	Since my injury there have been times where I have felt low	1	2	3	4	5
44	I feel more impatient since my injury	1	2	3	4	5
45	Since my injury I have days where my mind seems elsewhere	1	2	3	4	5
46	Since the injury there have been times where my recovery is not high on my priorities	1	2	3	4	5
47	I have felt tense since my injury	1	2	3	4	5
48	Since my injury I get easily distracted	1	2	3	4	5
49	I find it difficult to keep calm since my injury	1	2	3	4	5
50	Since my injury I don't know what the future holds	1	2	3	4	5
51	Since my injury I have felt frustrated	1	2	3	4	5
52	At times I feel like I have more questions than answers about my injury	1	2	3	4	5

Perceived Injury Severity Scale Study 4 (Taylor and May, 1996) – Study 4

Please respond to the following statements using the scale below.

		Very Strongly Disagree	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Very Strongly Agree
1.	As injuries go, mine is serious.	1	2	3	4	5	6	7.
2.	I see this injury as a serious threat to my sport/exercise involvement.	1	2	3	4	5	6	7.
3.	I fear that this injury will affect my long-term sports involvement.	1	2	3	4	5	6	7.
4.	This injury is too serious to not follow medical advice.	1	2	3	4	5	6	7.
5.	Injuries like this are minor interruptions to my sport/exercise involvement	1	2	3	4	5	6	7.

Appendix 46 Social Support Inventory for Injured Athletes (Mitchell et al, 2005)

Social Support Inventory for Injured Athletes (SSIIA)

Below are a list of items referring to the types of help and support you might get from others whilst injured. Please indicate to what extent these relate to you, by circling your response to each question on the numbered scale shown below. Please make sure that only one number is circled and that there are no circles between any two numbers.

1 = not at all
2 =
3 = somewhat
4 =
5 = a lot.

To what extent do you have someone...	**Not at all**		**somewhat**		**a lot**
1) Who gives you moral support when you're feeling down?	1	2	3	4	5
2) Who helps with transport?	1	2	3	4	5
3) Who is always there for you?	1	2	3	4	5
4) Who lifts your morale when it's down?	1	2	3	4	5
5) To whom you can always turn?	1	2	3	4	5
6) Who tells you, you can do it?	1	2	3	4	5
7) Whom you turn to for advice about life direction issues?	1	2	3	4	5
8) Who helps plan training to deal with injury problems?	1	2	3	4	5
9) Who helps you make decisions?	1	2	3	4	5
10) Who would give you financial help for injury treatment?	1	2	3	4	5
11) Who helps you solve problems in training?	1	2	3	4	5
12) Who motivates you?	1	2	3	4	5
13) Who listens to your concerns?	1	2	3	4	5
14) Who reassures you?	1	2	3	4	5
15) Who helps setting sessions in training?	1	2	3	4	5
16) Who helps you consider your options regarding your future?	1	2	3	4	5

Appendix 46 Social Support Inventory for Injured Athletes (Mitchell et al, 2005)

SSIIA - 4 subscales, 16 items

Subscale	Item	Item description
Emotional	1	*Who gives you moral support when you're feeling down*
	5	*To whom you can always turn*
	3	*Who is always there for you*
	13	*Who listens to your concerns*
Esteem	14	*Who reassures you*
	6	*Who tells you, you can do it*
	12	*Who motivates you*
	4	*Who lifts your moral when its down*
Tangible	15	*Who helps setting sessions in training*
	10	*Who would give you financial help for injury treatment*
	8	*Who helps plan training to deal with injury problems*
	2	*Who helps with transport*
Information	9	*Who helps you make decisions*
	11	*Who helps you solve problems in training*
	16	*Who helps you consider your options regarding your future*
	7	*Whom you can turn to for advice about life direction issues*

Injury coding list.

1. Achilles Injury
2. Ligament Tear
3. Broken Rib / Rib Damage
4. Metatarsal Broken / Broken Toes
5. Ankle Injury / Sprain
6. Broken Leg
7. Back Injury Not Diagnosed
8. Broken Hand
9. Broken Nose
10. Knee Injury – Non Diagnosis / Not Clear
11. Arm Injury – Unclear
12. Dead Leg
13. Leg Injury – Not Clear
14. Torn Hamstring
15. Broken Ankle
16. Hip Injury – Unclear
17. Dislocated Knuckle
18. Whiplash
19. Tennis Elbow
20. Knee Injury – Tear Ligaments
21. Shin Splints
22. Pulled muscle in Back
23. Cuts
24. Runners Knee
25. Frozen Shoulder
26. Hip Bursitis
27. Broken Arm
28. Muscle Cramp
29. Back injury – diagnosed (12 vertebrae)
30. Torn Bicep
31. Broken Foot
32. Wrist Injury – Unclear
33. Broken Collarbone
34. Multiple Leg Break
35. Broken Back
36. Concussion
37. Torn Ear / Earlobe
38. Golfers Elbow
39. Head Injury / Cut
40. Broken Jaw
41. Broken Cheek Bone
42. Ingrowing Toe Nail
43. Broken Wrist
44. Broken Eye Socket
45. Broken Thumb
46. Dislocated Shoulder
47. Multiple Head Injuries

48. Sciatica
49. Foot Injury – twisted / Unclear
50. Cut Thumb
51. Cracked / Broken Skull
52. Dislocated Knee
53. Slipped Disc Neck
54. Torn Rotator Cuff
55. Muscle Injury - Unclear)
56. Dislocated Elbow
57. Stomach Strain
58. Sternum Separation
59. Broken Finger
60. Groin Strain
61. Sinus Cavity injury
62. Compartment Syndrome
63. Soft Tissue neck injury
64. Slipped Disc in Back
65. Muscle Pull in Leg
66. Broken Ankle
67. Hip Injury – Dysfunction
68. Cut Tongue
69. ACL Injury – Requires surgery
70. Eye Damage (unclear / Black Eye)
71. Hamstring Strain
72. Multiple up body bone break
73. Elbow Injury – Undiagnosed / Unclear
74. Multiple Arm Break
75. Neck Injury – Undiagnosed / Unclear.

Appendix 48 Confirmatory Factor Analysis Path Diagram